22 FT.

7C2

EPA WORK ASSIGNMENT NUMBER : 041-2Z00
EPA CONTRACT NUMBER : 68-W8-0110
EBASCO SERVICES INCORPORATED

ARCS II PROGRAM

FINAL DRAFT
ENVIRONMENTAL PRIORITIES INITIATIVE/ PRELIMINARY ASSESSMENT (EPI-PA)
ALCAN POWDERS & PIGMENTS
CITY OF UNION
UNION COUNTY, NEW JERSEY
CERCLIS NO.: NJD065815771

SEPTEMBER 1992

NOTICE

THE INFORMATION IN THIS DOCUMENT HAS BEEN FUNDED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) UNDER ARCS II CONTRACT NO. 68-W8-0110 TO EBASCO SERVICES INCORPORATED (EBASCO). THIS DOCUMENT HAS BEEN FORMALLY RELEASED BY EBASCO TO THE USEPA. THIS DOCUMENT DOES NOT, HOWEVER, REPRESENT USEPA POSITION OR POLICY, AND HAS NOT BEEN FORMALLY RELEASED BY USEPA.

EPA WORK ASSIGNMENT NUMBER : 041-2Z00
EPA CONTRACT NUMBER : 68-W8-0110
EBASCO SERVICES INCORPORATED

FINAL DRAFT
ENVIRONMENTAL PRIORITIES INITIATIVE/ PRELIMINARY ASSESSMENT (EPI-PA)
ALCAN POWDERS & PIGMENTS
CITY OF UNION
UNION COUNTY, NEW JERSEY
CERCLIS NO.: NJD065815771

SEPTEMBER, 1992

SUBMITTED BY :

John F. Haas
Author
Task Leader
C.C. Johnson & Malhotra, P.C.

APPROVED BY :

Ming Kuo, PhD, PE
ARCS II Technical Support Manager
Ebasco Services Incorporated

REVIEWED BY :

Edgar J. Aguado
EPI-PA Site Manager
Ebasco Services Incorporated

SITE SUMMARY AND RECOMMENDATION

The Alcan Powders and Pigments (Alcan) Site is approximately 17 acres and is located in Union County, New Jersey. The site is currently included in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) under the U.S. Environmental Protection Agency (EPA) and the CERCLIS Number is NJD065815771. The entirely fenced site is active and is engaged in the production of metal powders and pigments utilized mainly in the auto industry. The site is located in a residential/industrial area. Figure 1, Site Location Map, shows a one mile radius including the nearest occupied residence, nearest drinking groundwater well, nearest surface water body, drinking water intake, wetlands and other sensitive environments. Figure 2, Site Sketch, includes site features on and around the site.

The site was originally developed by Metal Disintegrating in 1916. Metal Disintegrating mainly produced copper powder until the early 1960's. Martin Marietta then owned the site. Information on the site activities conducted by Martin Marietta is unavailable. The current owners, Alcan Aluminum Corporation, acquired the site in 1963. Current site activities include the milling, grinding and atomization of non-ferrous metals including copper, tin and bronze into powders. They also manufacture flake particles/powders of specialty metals including antimony, magnesium, silicon, nickel and silver. The facility previously manufactured aluminum paste and aluminum powder; however, this operation was moved to Alcan's facility in Illinois. The products produced at this facility are used in the auto industry in the manufacture of filters, engine batteries, small gears and sprockets and brushes for electric motors. Approximately, 76 people are employed on-site.

Wastes generated include mineral spirits and lubricating oils used in maintenance. The mineral spirits are used in the specialty products production. A slurry of mineral spirits, silver and nickel are pumped into a hammermill. The slurry is eventually pumped to a filter press where the mineral spirits are collected in a vat to be reused. When the mineral spirits cannot be reused, they are pumped from the vat into barrels and treated as waste.

The tank farm area stored only raw materials and hence it is not a solid waste management (SWMU). The waste mineral spirits and lubricating oils are stored in the Hazardous Waste Storage area. Since, at this stage, mineral spirit and lubricating oils are usable, this unit is not considered a SWMU. The only SWMU is a storage area (surface barrels) diked 50-foot by 8-foot concrete pad located west of Building 2. At the time of the reconnaissance it was observed that 20 fifty-five gallon barrels were being held in the SWMU. Of those barrels, ten contained sludge removed from the bottoms of the sumps located on-site. These barrels were placed in the SWMU by O'Brien & Gere. O'Brien & Gere have been contracted by the current owners to conduct a site cleanup under the Emergency Cleanup Response Act (ECRA). One of these barrels was leaking; however, the leaking substance was confined within the dike. The immediate area surrounding the SWMU is paved and impermeable. Runoff drains away from the area in a northwest direction and collects at a low point in the paved area where the drainage is allowed to evaporate. Beyond this area, toward the southwest, lies a bare patch of soil. The entire site is fenced; however, the SWMU is easily accessible.

No stains were observed on the paved areas or the bare patch of soil. No vegetation exists within the proximity of the SWMU. Other vegetation, within the fenced site and surrounding area, show

no signs of stress. There is no other evidence of contamination or releases to soil, groundwater, surface water or air related to solid waste management units (SWMU's). However, it is known that there have been releases in the past.

It is unknown whether neighboring properties or other off-site properties are contaminated due to this facility. It is also unknown whether there are any National Priority List (NPL) or Resource Conservation and Recovery Act (RCRA) industrial facilities or any potential sources of contamination within a one-mile radius of the site. Various investigative sampling activities were conducted by O'Brien & Gere and Recon Systems. The purpose of these programs was to determine the impact of past practices the facility had on the environment.

In August, 1980, Alcan notified USEPA of hazardous waste activities on-site. A RCRA Part A Permit was filed in November 1980. In January 1981, the Alcan site was listed as a treatment, storage and disposal (TSD) facility. However, it was subsequently delisted as a TSD facility and changed to a generator only.

In April 1986, O'Brien & Gere performed an initial site assessment to determine the impact of on-site petroleum storage tanks. This study consisted of soil borings and monitoring well installation to investigate possible contamination to sub-surface soils and site groundwater quality.

In August 1987, Recon Systems conducted a soil sampling program to investigate possible contamination by plant process metals. Groundwater samples were also taken to confirm data collected by O'Brien & Gere in 1986.

An extensive and comprehensive sampling program was conducted by O'Brien & Gere from February 1988 to June 1988. Sampling activities included: shallow and deep aquifer groundwater sampling, soil and air sampling, underground storage tank (UST) integrity and wipe sampling of building interiors. Twenty six additional soil samples were obtained by O'Brien & Gere and analyzed by the United States Testing Company for EPA toxicity and inorganic metals.

Samples from these investigations showed that the soils and groundwater on-site were contaminated. Results showed that the on-site soils were contaminated with fuel oils, mineral spirits and metals including copper, lead and nickel. The investigation determined that the groundwater in the shallow aquifer was contaminated with various constituents exceeding the guidelines, including: metals, petroleum hydrocarbons, and volatile organics . Cadmium, chromium and lead were found most often to exceed the guidelines.

Elevated levels of copper and zinc were also commonly found. Many samples also exceed the guidelines set for petroleum hydrocarbons. The water data indicated that a plume of free phase and dissolved petroleum hydrocarbons existed within the shallow aquifer. The data showed that the plume appeared to be located in a central portion of the site extending down gradient. The volatile petroleum compounds benzene, toluene, ethyl benzene, and xylene (BTEX) also were found in high levels.

O'Brien & Gere utilized this information to develop a soil and groundwater remediation program consistent with the Environmental Conservation and Recovery Act (ECRA) guidelines.

The New Jersey Department of Environmental Protection (NJDEP) cleanup guidelines utilized by O'Brien & Gere for on-site soils are listed below:

Compound	NJDEP Cleanup Guideline
Petroleum Hydrocarbons	100 mg/kg
Volatile Organics	1 mg/kg
Compound	**NJDEP Cleanup Guideline**
PCBs	5 mg/kg
Antimony	10 mg/kg
Arsenic	20 mg/kg
Barium	400 mg/kg
Beryllium	1 mg/kg
Cadmium	3 mg/kg
Chromium	100 mg/kg
Copper	170 mg/kg
Lead	1000 mg/kg
Mercury	1 mg/kg
Nickel	100 mg/kg
Selenium	4 mg/kg
Silver	5 mg/kg
Thallium	5 mg/kg
Zinc	350 mg/kg

mg/kg = milligram/kilogram

Soil samples, gathered by test borings throughout the site, were analyzed to establish baseline conditions. Background levels are unknown.

The monitoring wells installed by O'Brien & Gere were installed to address on-site groundwater contamination. The NJDEP cleanup guidelines utilized for on-site ground water were utilized as follows:

Compound	NJDEP Cleanup Guideline	
Petroleum Hydrocarbons	1	mg/l
Total Volatile Organics	0.01	mg/l
Antimony	0.006	mg/l*
Arsenic	0.05	mg/l
Barium	1	mg/l
Beryllium	0.004	mg/l*
Cadmium	0.01	mg/l
Chromium	0.05	mg/l
Copper	1	mg/l
Lead	0.05	mg/l
Mercury	0.002	mg/l
Nickel	0.1	mg/l*
Selenium	0.01	mg/l

Thallium	0.002	mg/l*
Zinc	5	mg/l

* NPDWS = National Interim Priority Drinking Water Standard

The cleanup was implemented under four independent contracts: Contract 1 - General Cleaning, Contract 2 - Tank (UST) Removal and Disposal, Contract 3 - Soil Excavation and Disposal and Contract 4 - Groundwater Remediation. In July 1989 Contracts 1,2, and 3 were awarded to Enroserv, Inc. Contract 4 was altered slightly and awarded in July 1990.

The scope of the General Cleaning contract was to clean an existing moat and utility trench of all debris and metal-laden sludge; to clean all areas of lead and cadmium residue from the interior of Building 1 and to clean the existing combined sewer system of all debris and metal-laden sludge. This contract was implemented from August 1989 to November 1989. Portions of this contract were deleted from the scope of work and added to Contract 4 as a subcontract.

The main scope of the UST removal contract was to remove the USTs and to remove contaminated soils encountered during the removal. This contract was implemented from September 1989 to November 1989. All tanks were removed, except for two tanks, which have subsequently been sand-filled and abandoned. The installation of three above-ground mineral spirit tanks was deleted from the contract and repackaged under Contract 4.

The scope of the Soil Excavation and Disposal Contract was to remove soil to various depths throughout the site. Once excavated, the soil was to be characterized and properly disposed of. This contract was implemented from August 1989 to January 1990. Soil remediation was accomplished by excavating the contaminated soils and backfilling with clean fill. Fill areas were then covered with bituminous pavement with an asphalt sealant. Excavated soils from this contract and the UST Removal contract were stockpiled in an area adjacent to Building 9. This is an asphalt paved area. This area was covered by a polyethylene liner with physical barriers placed around the edges during stockpiling activities. The top of the soil was also covered with polyethylene sheeting. The contaminated soil was transported to American Waste-Breitenstine Landfill in Waynesburg, Ohio. Approximately 3,800 cubic yard of soil was excavated and disposed.

The scope of the Ground Water Remediation Contract was to install a complete groundwater collection system, install the new mineral spirit storage and transfer system and to clean the existing sewer system. The sewer cleaning was performed by Fred A. Cook Jr. and completed in December 1990. The three above-ground tanks have been installed but are not yet operational. The ground water recovery system was installed in February 1991 and the effluent sampled. The remediation system will be comprised of sand filters and carbon filters.

Current RCRA status lists Alcan as a generator only. The last inspection conducted by the NJDEP was August 15, 1989. Minor violations were noted.

The Brunswick Formation of the Late Triassic age is the major aquifer in Union County. Water in this formation occurs in joints and fractures. Unconfined groundwater occurs mainly in the

upland areas where overlying unconsolidated sediments are thin or absent. Lowland rocks, mainly located in the southern and eastern regions of Union County, are mantled by Pleistocene deposits mostly containing silt and claybeds. In these lowland areas the silts and clay beds may confine water in the underlying rocks. The Brunswick formation is between 6,000 to 8,000 feet thick.

The Watchung Basalt formation is a minor aquifer. The Basalt formation is between 330 and 800 feet thick and is comprised of basaltic lava sheets intercalated with the Newark Group sedimentary rocks. Groundwater underneath the site flows in a northwest direction.

Soil borings taken by O'Brien & Gere indicate that the thickness of the unconsolidated glacial till overlying the bedrock ranges from 6 to 20 feet. Groundwater elevation data indicates that groundwater lies 6.9 to 16.5 feet below grade. Groundwater mapping conducted by O'Brien & Gere shows that groundwater generally flows in northerly direction. Alcan uses three wells to draw water from the deep aquifer. The water is used for contact and non-contact cooling purposes. Drinking water for the Union Township comes from surface waters outside a four-mile radius of the site. Surface water is supplemented by well fields. The closest wellfield, Hummocks Station, lies approximately one mile northwest of the site. The total drinking water population from groundwater sources within a four-mile radius of the site is 66,958.

The nearest surface water is the Elizabeth River which lies approximately 3,000 feet northeast of the site. The flow rate is unknown. An overland pathway from the site to this surface body is not apparent due to the development of the surrounding areas. Additionally, surface water is not used for drinking water purposes within a fifteen-mile radius downstream of the probable potential point of entry.

The surface runoff from the site flows to a nearby storm drain. The outfall for these storm drain is located on a creek that discharges into Elizabeth River. This is probable point of entry (PPE) into surface water. No drinking water intakes were identified within 15 miles downstream of PPE. The Elizabeth River AND Arthur Kill were identified as fisheries (sensitive environments) within 15 miles downstream of PPE. Numerous sensitive environments are also within 15 miles downstream of PPE. The site is located in a flood plain of greater than 500 years.

The nearest private residence is located approximately 100 feet north of the site. There are no schools or day care facilities within 200 feet of the known areas of contamination. Approximately 28 households are located within 200 feet of the site. There are no terrestrially sensitive environments within 200 feet of the site. Approximately 22,781 people reside within 1 mile radius of the site.

The approximate number of people with 4 mile radius of the site is 446,678. No sensitive environments were identified within 1/2 mile radius of the site.

In summary, the suspected releases of contamination from the site is to the shallow aquifer. Furthermore, the shallow aquifer most likely discharges to nearby surface waters. Drinking water is not obtained from the surface water; however, primary targets do exist within 15 miles of the probable point of entry. Primary targets involved include: Numerous Fish/Invertebrate Habitats, Endangered Species Habitat, Wetlands, Marshes, and Tidal Flats. Based on the potential for

contaminant release to groundwater, the Alcan Powders and Pigments site may pose a threat to the public health and environment. Remedial action should include remediation of the shallow aquifer down gradient from the site. In addition is unknown whether a release to soils from the site has occurred. It is unknown whether soils off-site have been contaminated. Therefore, it is recommended that additional sampling be conducted. This effort should include soils off-site and down gradient of the site.

SITE ASSESSMENT REPORT: ENVIRONMENTAL PRIORITIES INITIATIVE/ PRELIMINARY ASSESSMENT (EPI-PA)

PART I: SITE INFORMATION

1. Site Name/Alias: Alcan Powders & Pigments

   Street: 901 Lehigh Avenue

   City: Union State: New Jersey Zip: 07083

2. County: Union County Code: 039 Cong. Dist.: 7

3. EPA ID No.: NJD065815771

4. Block No.: 504 Lot No.: 4,5,6 & 7

5. Latitude: N40°-40'-57" Longitude: W74°-14'-33"

   USGS Quad.: Elizabeth, NJ

6. Owner: Alcan Aluminum Corporation Tel. No.: 216/523-6800

   Street: 100 Earview Avenue

   City: Cleveland State: Ohio Zip Code: 44101

7. Operator: Alcan Aluminum Corporation Tel.No: 216/523-6800

   Street: 100 Earview Avenue

   City: Cleveland State: Ohio Zip Code: 44101

8. Type of Ownership

   ⊗ Private O Federal O State

   O County O Municipal O Unknown O Other

9. Owner/Operator Notification on File

   ⊗ RCRA 3001 Date: 8/15/80 O CERCLA 103C Date:

   O None O Unknown

10. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
APC	31423	O6/08/77	06/08/92	
APC	34709	11/17/77	11/17/92	
APC	34710	11/17/77	11/17/92	
APC	34711	11/17/77	11/17/92	
APC	31422	06/02/78	06/02/93	
APC	39784	06/16/78	06/16/93	
APC	40484	08/80/78	08/30/93	
APC	66101	09/29/83	09/29/93	
APC	66102	09/28/83	09/28/93	
APC	76774	12/30/86	06/16/94	
APC	42997	06/23/79	06/21/94	
APC	79963	10/27/87	07/17/94	
APC	76773	03/19/87	09/03/94	
APC	90603	05/12/89	02/05/95	
APC	90455	05/18/89	02/11/95	
APC	89537	02/23/89	02/17/95	
APC	02017	06/23/80	06/22/95	
APC	18699	UNKNOWN	06/23/95	
APC	89538	02/23/89	11/14/95	
APC	73334	10/22/85	10/22/95	
APC	73702	10/22/85	10/22/95	
APC	73333	10/24/85	10/24/95	
APC	73176	11/12/85	11/12/95	
APC	02471	12/02/80	12/02/95	
APC	19919	12/03/80	12/03/95	
APC	74023	01/28/86	01/28/96	
APC	03396	04/05/81	04/05/96	
APC	03034	04/05/81	04/05/96	
APC	74235	02/26/86	08/24/96	
APC	48776	09/09/81	09/09/96	
APC	76420	02/24/87	10/24/92	

11. Site Status

⊗ Active O Inactive O Unknown

12. Years of Operation: 1963 to Present

13. Identify the types of waste sources (eg., landfill, surface impoundment, piles, stained soil, above or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Sources

Waste Unit No.	Waste Source Type	Facility Name for Unit
1	Surface Drums	Hazardous Waste Storage

(b) Other Areas of Concern

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

Listed below is a summary of hazardous waste discharges known to have occurred at the Alcan site as presented in O'Brien & Gere's Site Remediation Final Report Exhibit 5:

1.) Date of Discharge or Identification of Discharge: May 14, 1982

Description of Discharge Event:
A process tank within the concrete diked tank farm was overfilled and mineral spirits escaped through the tank's vent pipe. The mineral spirits flowed from the vent pipe, down the tank wall, along the retaining wall, and out of the tank farm's containment area through an open valve discharging into the soil between the tank farm and the railroad tracks. A pool of mineral spirits was trapped between the plant's fence and the Conrail Lehigh Valley Railroad tracks.

Response and Resolution:
Approximately 900 gallons of free product was recovered from the pool of mineral spirits between the plant's fence and the Conrail Lehigh Valley Railroad tracks.

2.) Date of Discharge or Identification of Discharge: July 1984

Description of Discharge Event:
Palmitic and stearic acid mixed with mineral spirits was found in a creek to the southeast of the facility.

Response and Resolution:
The creek was boomed and skimmed.

3.) Date of Discharge or Identification of Discharge: September 27, 1985

Description of Discharge Event:
Propane gas leaked from a two-inch underground propane gas line located near the factory and migrated off-site into a nearby residence on Lehigh Avenue. An explosion occurred on September 27, 1985 which resulted in property damage to the residence.

Response and Resolution:
Alcan Powders and Pigments installed a trench fitted with blowers to vent propane gas. Gas readings within the location on January 6, 1986 were zero.

4.) Date of Discharge or Identification of Discharge: September 21, 1986

Description of Discharge Event:
During the drilling of a monitoring well at the site, mineral spirits were discovered within the subsurface soils.

Response and Resolution:
The NJDEP was notified of the identified contamination and issued a Notice of Violation along with procedures for documenting the cleanup.

5.) Date of Discharge or Identification of Discharge: September 30, 1986

Description of Discharge Event:
Approximately 50 to 60 gallons of naphtha (petroleum distillates) spilled near Tank No. 7 (located near the tank farm).

Response and Resolution:
Spilled material was absorbed using sawdust and "Speedy-Dri". The saturated absorbent material generated during the cleanup was disposed as hazardous waste.

6.) Date of Discharge or Identification of Discharge: August 16, 1986

Description of Discharge Event:
Traces of free product were discovered during the excavation of underground storage tanks. (Tank Nos. 5,17 and 20).

Response and Resolution:
The NJDEP's Bureau of Underground Storage Tanks was notified. Contaminated soil was removed and disposed.

7.) Date of Discharge or Identification of Discharge: August 16, 1989

Description of Discharge Event:
Traces of free product were discovered during the excavation of underground storage tanks. (Tank Nos. 21 and 22).

Response and Resolution:
The NJDEP's Bureau of Underground Storage Tanks was notified. Contaminated soil was removed and disposed.

14. Information available from

Contact: Luz Martinez Agency: USEPA Tel.No.: (212) 264-4561

Preparer: John F. Haas Agency: CCJM Date: 9/1/92

PART II:WASTE SOURCE INFORMATION (For RCRA Solid Waste Management Units (SWMUs)

For each of the waste units identified in Part I, complete the following items.

Waste Unit No. 1 Surface Drums Drum Storage Area

1. **Identify the RCRA status and permit history, if applicable, and the age of the SWMU**

   The SWMU was installed in 1980.

2. **Describe the SWMU and clearly identify its location on a site map**

   The SWMU is a diked concrete pad approximately 8ft x 50ft located on the west side of the Warehouse.

3. **Identify the size or quantity of the waste (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums, or tanks,). Specify the quantity of hazardous substances in the waste unit.**

   Ten (10) fifty-five gallon drums of spent mineral spirits and ten (10) fifty-five gallon drums of soils contaminated with mineral spirits were present at this SWMU at the time of this inspection.

4. **Identify the physical state(s) of the waste(s) as disposed of in the SWMU. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid or gas.**

   The physical states include solids and liquids.

5. **Identify specific hazardous substance(s) known or suspected to be present in the SWMU.**

   One of the barrels containing contaminated soil was leaking at the time of inspection. However, the spill was contained within the SWMU. A 2-inch pipe with a gate valve is utilized to drain the confinement area. The valve was closed at the time of this inspection.

6. **Describe the containment of the SWMU unit as it relates to releases to groundwater, surface water, soil and air. However, it is known that releases to the soil and the shallow aquifer have occurred in the past.**

   The SWMU is diked with a four-inch high concrete curb and the area surrounding the SWMU is paved;therefore, the probability of a release to the groundwater, soil or surface water is low.

SWMU-specific Conclusion:

No release of hazardous substances is known, alleged, or suspected to have occurred from this SWMU.

Ref. No. 1,Exhibits 1,5;3.

PART III:PREVIOUS INVESTIGATIONS

EXISTING ANALYTICAL DATA

Groundwater samples were collected from the shallow aquifer and analyzed for total priority pollutant metals. The metal concentrations were compared to the National Interim Primary Drinking Water Standards for those metals for which these standards exist. Cadmium, chromium and lead were consistently found in groundwater exceeding the standards. Excessive concentrations of copper were also detected in two wells. Groundwater samples were also collected and analyzed for total petroleum hydrocarbons. Concentrations exceeded State guidelines in nine of the twelve wells. Groundwater samples were also analyzed for volatile halogenated organics.

The Alcan site maintains three deep aquifer supply wells within the site. These wells are used to supply water for contact and non-contact cooling purposes. Similar to groundwater samples taken from the shallow aquifer, methylene chloride was shown in each of the samples during both the April and July 1988 sampling periods. However, methylene chloride was reported in quality control blanks.

Analytical results for groundwater testing of the shallow and deep aquifer for the April 1988 period are given on the following pages.

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

Pollutant Metal	MW-1 mg/1	MW-2 mg/1	MW-3 mg/1	MW-4 mg/1	MW-5 mg/1	MW-6 mg/1
Date Sampled	7/7	/6	7/6	7/6	7/6	7/7
Total Antimony	ND	ND	ND	ND	ND	ND
Total Arsenic	ND	ND	0.009	0.020	ND	ND
Total Beryllium	ND	ND	ND	ND	ND	ND
Total Cadmium	0.02	0.01	0.02	0.03	0.01	ND
Total Chromium	0.26	ND	0.033	0.05	ND	0.122
Total Copper	0.26	0.16	0.12	0.5	0.25	0.68
Total Lead	0.213	0.053	0.079	0.306	0.167	0.037
Total Mercury	ND	ND	ND	ND	ND	0.068
Total Nickel	ND	ND	ND	0.54	ND	0.89
Total Selenium	ND	ND	ND	ND	ND	ND
Total Silver	ND	ND	ND	ND	ND	ND
Total Thallium	ND	ND	ND	ND	ND	ND
Total Zinc	0.57	0.08	0.1	1.89	0.09	0.15
Total Petroleum Hydrocarbons	<0.5	30	7	6440	1.3	.0

ND = None Detected

All samples collected in 1988.

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS
(CONTINUED)

Pollutant Metal	MW-8 mg/l	MW-9 mg/l	MW-10 mg/l	MW-11 mg/l	MW-12 mg/l	MW-13 mg/l
Date Sampled	7/7	7/7	7/6	7/6	7/6	7/6
Total Antimony	ND	ND	ND	ND	ND	ND
Total Arsenic	ND	ND	ND	ND	0.006	0.006
Total Beryllium	ND	ND	ND	ND	ND	0.036
Total Cadmium	ND	ND	0.02	0.02	0.02	0.04
Total Chromium	ND	0.152	0.17	ND	0.083	0.39
Total Copper	0.07	0.27	4.59	0.42	5.08	0.73
Total Lead	0.202	0.132	4.46	0.079	0.140	0.537
Total Mercury	ND	ND	ND	ND	ND	ND
Total Nickel	ND	ND	ND	ND	ND	0.77
Total Selenium	ND	ND	ND	ND	ND	ND
Total Silver	ND	ND	ND	ND	ND	ND
Total Thallium	ND	ND	ND	ND	ND	ND
Total Zinc	0.04	0.26	0.76	0.14	1.45	0.036
Total Petroleum Hydrocarbons	2.75	0.6	<0.5	10	6	26

ND = None Detected

All samples collected in 1988.

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE ORGANICS

Pollutant Organic	MW-1 ug/l	MW-2 ug/l	MW-3 ug/l	MW-4 ug/l	MW-5 ug/l	MW-6 ug/l
Date sampled	7/7	7/6	7/6	7/6	7/6	7/7
Benzene	ND	21	17	ND	ND	3.8
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
2-Chloroethyvinyl Ether	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloro-propylene	ND	ND	ND	ND	ND	ND
cis,1,3-Dichloro-propylene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	748	ND	ND	19	ND
Methyl Bromide	ND	ND	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND	ND	ND
Methylene Chloride	10	11	8.0	11	11	9.6
1,1,2,2,-Tetra-chloroethane	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND
Toluene	ND	54	ND	ND	ND	ND
1,2-Trans-Dichloro-ethylene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND
Trichlorotri-fluoroethane	ND	ND	ND	80	7.6	ND
Vinyl Chloride	ND	ND	ND	ND	ND	

ND = None Detected

All samples collected in 1988.

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE ORGANICS
(CONTINUED)

Pollutant Organic	MW-8 ug/l	MW-9 ug/l	MW-10 ug/l	MW-11 ug/l	MW-12 ug/l	MW-13 ug/l
Date Sampled	7/7	7/7	7/6	7/6	7/6	7/6
Benzene	ND	ND	ND	11	11	9.4
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
2-Chloroethyvinyl Ether	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloro-propylene	ND	ND	ND	ND	ND	ND
cis,1,3-Dichloropropylene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	140	254
Methyl Bromide	ND	ND	ND	ND	ND	ND
Methyl Chloride	ND	ND	ND	ND	ND	ND
Methylene Chloride	11	11	11	11	11	11
1,1,2,2,-Tetra-chloroethane	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
1,2-Trans-Dichloro-ethylene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND

ND = None Detected

All samples collected in 1988.

DEEP AQUIFER GROUND WATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

Pollutant Metal	Supply Well Number 1 (mg/l)	Supply Well Number 2 (mg/l)	Supply Well Number 3 (mg/l)
Date Sampled	7/7	7/6	7/6
Total Antimony	ND	ND	ND
Total Arsenic	ND	ND	ND
Total Beryllium	ND	ND	ND
Total Cadmium	ND	ND	ND
Total Chromium	ND	ND	ND
Total Copper	ND	ND	ND
Total Lead	0.037	ND	0.035
Total Mercury	ND	ND	ND
Total Nickel	ND	ND	ND
Total Selenium	ND	ND	ND
Total Silver	ND	ND	ND
Total Thallium	ND	ND	ND
Total Zinc	ND	ND	ND
Total Petroleum Hydrocarbons	<0.5	<0.5	<0.5

ND = None Detected

All samples Collected in 1988.

DEEP AQUIFER GROUND WATER ANALYSES
VOLATILE ORGANICS

Pollutant Organic	Supply Well Number 1 (ug/l)	Supply Well Number 2 (ug/l)	Supply Well Number 3 (ug/l)
Date Sampled	7/7	7/6	7/6
Benzene	ND	ND	ND
Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND
Chlorobenzene	ND	ND	ND
Chlorodibromomethane	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethyvinyl Ether	ND	ND	ND
Chloroform	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
trans-1,3-Dichloropropylene	ND	ND	ND
cis,1,3-Dichloropropylene	ND	ND	ND
Ethylbenzene	ND	ND	ND
Methyl Bromide	ND	ND	ND
Methyl Chloride	ND	ND	ND
Methylene Chloride	11	9.8	9.7
1,1,2,1,-Tetrachloroethane	ND	ND	ND
Tetrachloroethylene	85	16	83
Toluene	ND	ND	ND
1,2-Trans-Dichloroethylene	20	62	20
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethylene	44	66	48
Trichlorotrifluoroethane	ND	ND	ND
Vinyl Chloride	ND	ND	ND

ND = None Detected

All samples collected in 1988.

Analytical results of groundwater testing for metals and total petroleum hydrocarbons as reported by O'Brien & Gere can be found in Ref. No. 19.

Analytical results of groundwater testing for volatile halogenated organics as reported by O'Brien & Gere can be found in Ref. No. 20.

Analytical results for the three deep aquifer supply wells as reported by O'Brien & Gere can be found in Ref. Nos. 21 and 22.

SITE RECONNAISSANCE RESULTS

Alcan Powders & Pigments is an active processing plant employing 76 people which mills, grinds and atomizes non-ferrous metals into powders. The plant has been active since 1963. Previous owners conducted similar activities dating back to 1916. The current, owners Alcan Aluminum Corp., Cleveland, Ohio have contracted with O'Brien & Gere to conduct an Emergency Cleanup Response Act (ECRA) cleanup of the site. Cleanup activities included excavation of contaminated soils and backfilling with clean soils. Contaminated groundwater is being pumped from recovery wells and treated through sand and carbon filtration. Groundwater remediation is in its final stages.

The site is approximately 17 acres and is bordered by the Lehigh Valley Railroad to the southeast and a park and residential area to the north and northwest. Buildings on site range from one-story office space to two story warehouses. The fenced portion of the site is paved with the exception of a bare patch of ground (approximately 150ft x 50ft) located northwest of the Warehouse.

Some grass and other vegetation border the office and parking lot. None of these areas were stressed. Paved drainage areas and drainage paths, noted on the Site Sketch (Figure 2), showed no evidence of staining. One Solid Waste Management Unit was identified.

The SWMU consists of a diked 8ft x 50ft concrete pad. A two-inch valved pipe is imbedded in the dike along the northern side. This pipe is used to drain the SWMU.

Ten (10) fifty-five gallon drums of spent mineral spirits and ten (10) fifty-five gallon drums of soils contaminated with mineral spirits were placed in the SWMU. One of these barrels was leaking; however, the leak was contained within the SWMU. There is no roof covering the SWMU. No stains were noticeable around the SWMU and the dike was in good condition.

The drainage path was in a northerly direction from the SWMU. This area was paved and no drainage inlets existed in this area. The runoff collected at a low point in this area.

A photolog is given in Attachment A

REFERENCES

1. O'Brien & Gere, Site Remediation Alcan Powders and Pigments Union, New Jersey Facility, Exhibits 1,5; April 1991.

2. Geology and Ground-Water Resources of Union County, U.S. Geological Survey Water-Resources Investigations 76-73, Nemickas, pp. 4-25, Table 4; 1976.

3. John Haas, Field Logbook notes taken July 10, 1992.

4. New Jersey Department of Environmental Protection (NJDEP), Division of Hazardous Waste Management, Hazardous Waste Inspection Report, Alcan Powders and Pigments, Dan Burgoyne, August 1989.

5. O'Brien & Gere Site Remediation Alcan Powders and Pigments Union, New Jersey Facility, Appendix A pp. 7-10, April 1991.

6. Climatic Atlas of the United States, U.S. Department of Commerce, 1979.

7. John Haas, New Precipitation Calculations, August 5, 1992.

8. Richard Sadowsky, Superintendent, EWC, letter to Santosh Sharma, regarding drinking water wells/wellfields in Union County, July 27, 1992.

9. Telecon Note: Conversation between Santosh Sharma of CCJM, and Richard Sadowsky of EWC, July 31, 1992.

10. 1980 Population Graphical Exposure Modeling System, General Science Corporation, April 1990.

11. John Haas, 0-4 Mile Radius Population Calculations, August 5, 1992.

12. Site Remediation Alcan Powders & Pigments Union, New Jersey, Appendices A & B, O'Brien & Gere, April 1991; pp. 8, 9.

13. U.S. Geological Survey Topograhic Maps, 7.5 minute series, Roselle NJ Quadrangle, 1955, photorevised 1981; Elizabeth NJ Quadrangle, 1967, photorevised 1981.

14. Telecon Note: Conversation between John Haas, CCJM and Edul Daver, President Alcan Powders and Pigments, August 17, 1992.

15. Flood Insurance Rate Map for Township of Union, New Jersey, Union County, Community-Panel No. 34077 0001 A; August 1, 1978.

16. Urban Hydrology for Small Watersheds 2-Year 24-Hour Rainfall, Figure B.3, Soil Conservation Services, Washington, D.C., June 1986.

17. State of New Jersey Department of Environmental Protection, Bureau of Safe Drinking Water, Surface Water Intake Locations; Michael Mariano, March 1992.

18. Atlantic Coast Ecological Inventory, Newark; U.S. Fish and Wildlife Service, 1980.

19. O'Brien & Gere, Site Remediation Alcan Powders and Pigments Union, New Jersey Facility Appendix F Table 2, April 1991.

20. Ibid, Table 3.

21. Ibid, Table 4.

22. Ibid, Table 5.

PART IV: HAZARDOUS WASTE ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of the release of contaminant(s) to the groundwater as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provided rationale for attributing them to the site. For observed release, define supporting analytical evidence.**

   Review of the available documentation reveals no spills or releases to the groundwater associated with SWMU #1. However, a release to the shallow aquifer is known to have occurred in the past. Now abandoned USTs are suspected to be the source of past releases to the shallow aquifer.

   Ref. No. 1, Exhibit No. 5; 3.

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, areas of karst terrain, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

   The Brunswick Formation of the Late Triassic age is the major aquifer in Union County. Water in this formation occurs in joints and fractures. Unconfined groundwater occurs mainly in the upland areas where overlying unconsolidated sediments are thin or absent. Lowlands, mainly located in the southern and eastern regions of Union County, rocks are mantled by Pleistocene deposits mostly containing silt and claybeds. In these lowland areas the silts and clay beds may confine water in the underlying rocks. The Brunswick formation is between 6,000 to 8,000 feet thick.

   The Watchung Basalt formation is a minor aquifer. The Basalt formation is between 330 and 800 feet thick and is comprised of basaltic lava sheets intercalated with the Newark Group sedimentary rocks. The depth to groundwater is approximately 6.9 to 16.5 from the grade. The groundwater movement is towards northeast direction.

   Ref. No. 2 pp. 4,14,20; 5 pp. 7,8.

3. **Is a designated well head protection area within 4 miles of the site?**

   A designated well head protection area does not lie within a 4-mile radius of the site.

   Ref. No. 9.

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

   The depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern is 6.9 to 16.5 feet below grade.

5. What is the permeability value of the least permeable intervening stratum between the ground surface and the aquifer of concern?

The least permeable continuous intervening stratum between the ground surface and the aquifer of concern consists of the Watchung Basalt formation with a calculated coefficient of permeability of $(10)^{-5}$ cm/sec.

Ref. No. 2, 5.

6. What is the net precipitation for the area?

The net precipitation for the area is 15.28 inches.

Ref. No. 6, 7.

7. What is the distance to and depth of the nearest well that is currently used for drinking purposes.

The distance to the nearest well that is currently used for drinking purposes is approximately one mile northwest of the site. The depth of this well is unknown.

Ref. No. 8.

8. If a release to groundwater is observed or suspected, determine the number of people that obtain drinking water from wells that are documented or suspected to be located within the contaminated boundary of release.

The Alcan site is currently conducting groundwater remediation activities under Emergency Cleanup Response Act (ECRA) guidelines. The extent of groundwater contamination is unknown. The closest well/wellfield used for drinking water purposes is Hummocks Station located approximately one mile northwest of the site. Approximately 7,500 persons obtain their drinking water from this wellfield.

Ref. No. 8, 9.

9. Identify the population served by wells located within 4 miles of the site that draw from the aquifer of concern.

Distance	Population
0-1/4 mi	0
>1/4-1/2mi	0
>1/2-1mi	0
>1-2mi	17,333
>2-3mi	23,010
>3-4mi	26,615

10. **Identify uses of groundwater within 4 miles of the site (i.e. private drinking source, municipal source, commercial, irrigation, unusable.**

Uses of groundwater within 4-miles of the site include: municipal sources, commercial and irrigation.

Ref. No. 2 Table 4.

SURFACE WATER ROUTE

11. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed release, suspected release, of none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence.**

A release of palmitic and stearic acid mixed with mineral spirits to a ditch located southeast of the site was noted in July 1984. Upon discovery the creek was boomed and skimmed. The source was unidentified.

No release to surface water is suspected in relation to the SWMUs.

However, a release to surface water is suspected from previous site activities.

Ref. No. 1, Exhibit 5; 3.

12. **Identify the nearest downslope surface water if possible, include a description of possible surface drainage patterns from the site.**

The nearest downslope surface water is a small creek which drains to the Elizabeth River.

Ref. No. 3,12,13,14.

13. **What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

The distance to the nearest downslope surface water is approximately 1,000 feet northeast of the site.

Ref. No. 3,13,14.

14. **Define the floodplain that the site is located within.**

The site is located within floodplain of greater than 500 years.

Ref. No. 15.

15. What is the 2-year 24-hour rainfall

The 2-year 24-hour rainfall is 3.5 inches.

Ref. No. 16.

16. Identify drinking water intakes in surface waters within 15 miles downstream of the site. For each intake identify: the distance from the point of surface water entry, population served, and stream flow at the intake location.

There are no drinking water intakes into surface waters within 15 miles downstream of the site.

Ref. No. 2,17.

17. Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each sensitive environment specify the following:

Fishery	Water Body Type	Flow
Arthur Kill	Estuary	Unknown
Elizabeth River	River	10-100

Ref. No. 13,18.

18. Identify sensitive environments that exist within 15 miles of the point of surface water entry. For each sensitive environment specify the following:

Environment	Water Body Type	Flow (cfs)
Numerous Fish/Invertebrate Habitat	Estuary	Unknown
Endangered Species Habitat (American Shad)	Estuary	Unknown
Wetlands	River	Unknown
Marshes	Estuary	Unknown
Tidal Flats	Estuary	Unknown
Elizabeth River	River	10-100
Arthur Kill	Estuary	Unknown

Ref. No. 13, 18.

19. **If release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 16-18 that are or may be located within the contamination boundary of the release.**

No release to the surface water was observed or is suspected in relation to the SWMU.

However, a release to surface water is suspected from previous site activities. The extent of contamination is unknown.

Ref. No. 12,13,18.

SOIL EXPOSURE PATHWAY

20. **Determine the number of people that occupy residence or attend school or day care on or within 200 feet of the site property.**

Approximately 76 people occupy residences within 200 feet of the site property.

Ref. No. 3.

21. **Determine the number of people that work on or within 200 feet of the site property.**

Approximately 76 people work on-site, it is unknown how many people work on adjacent properties.

Ref. No. 1,3.

22. **Identify terrestrially sensitive environments on or within 200 feet of the site property.**

No terrestrially sensitive environments exist on or within 200 feet of the site property.

Ref. No. 3.

AIR ROUTE

23. **Described the likelihood of release of contaminants to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provided a rationale for attributing them to the site. For observed release define the supporting analytical evidence.**

There is no suspected of release of contaminants to the air.

Ref. No. 1, Exhibit 5;3.

24. Determine populations that reside within 4 miles of the site

Distance	Population
0-1/2 mi	1,823
>1/4-1/2 mi	3,481
>1/2 - 1 mi	17,477
>1-2 mi	92,770
>2-3 mi	153,403
>3-4 mi	177,436

Ref. No. 10,11.

25. Identify sensitive environments and wetlands acreage within 1/2 mile of the site.

No wetlands or sensitive environments exist within 1/2-mile radius of the site.

Ref. No. 13,18.

26. If a release to air is observed or suspected, determine the number of people that reside or are suspected to reside within the area of the air contamination from the release.

No release to air was observed or suspected.

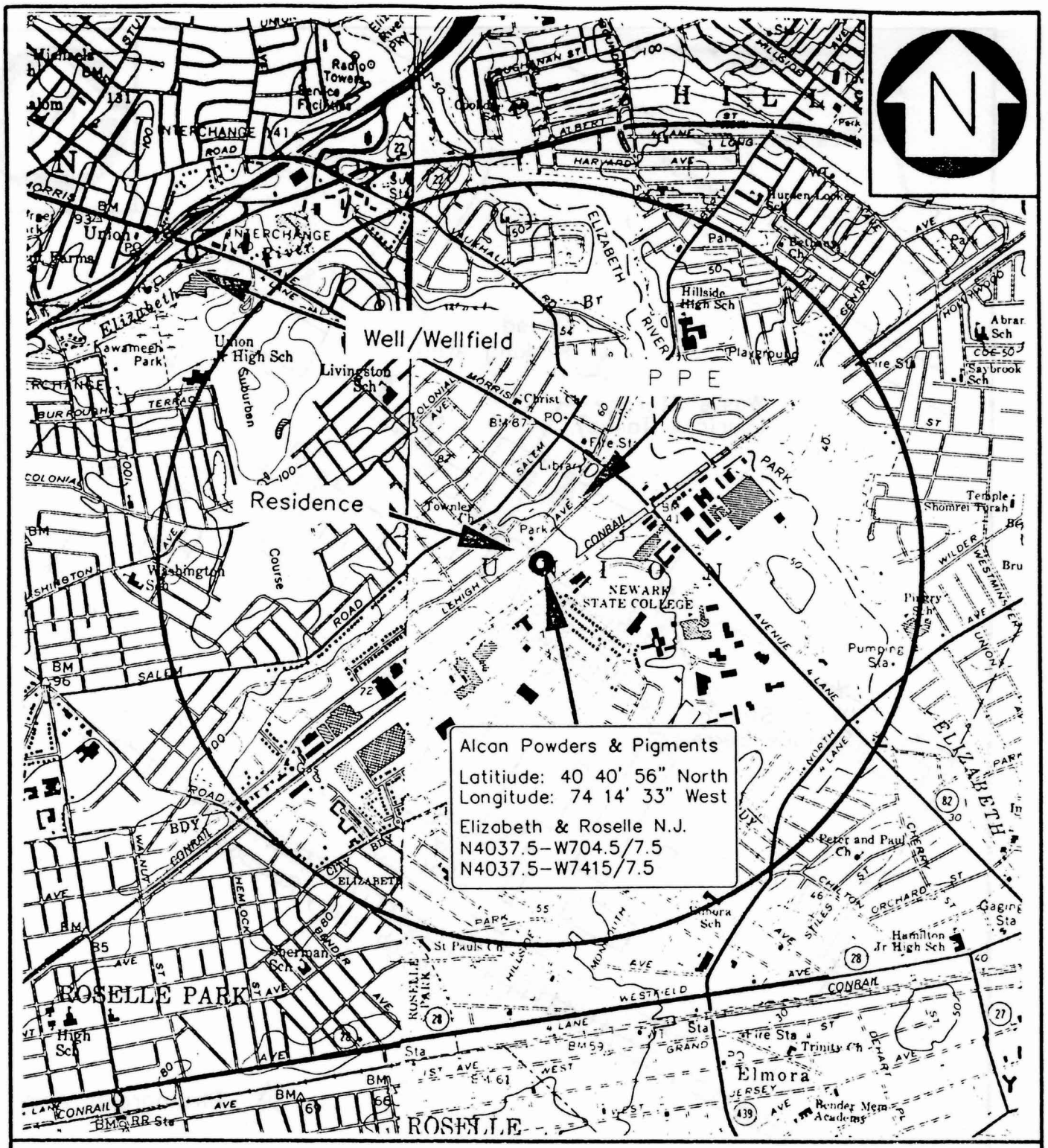
Ref. No. 1,3.

27. If a release to air is observed or suspected, identify any sensitive environments, listed in question No. 25, that are or may be located within the area of air contamination from the release.

No release to air was observed or suspected.

Ref. No. 1,3.

Attachment A

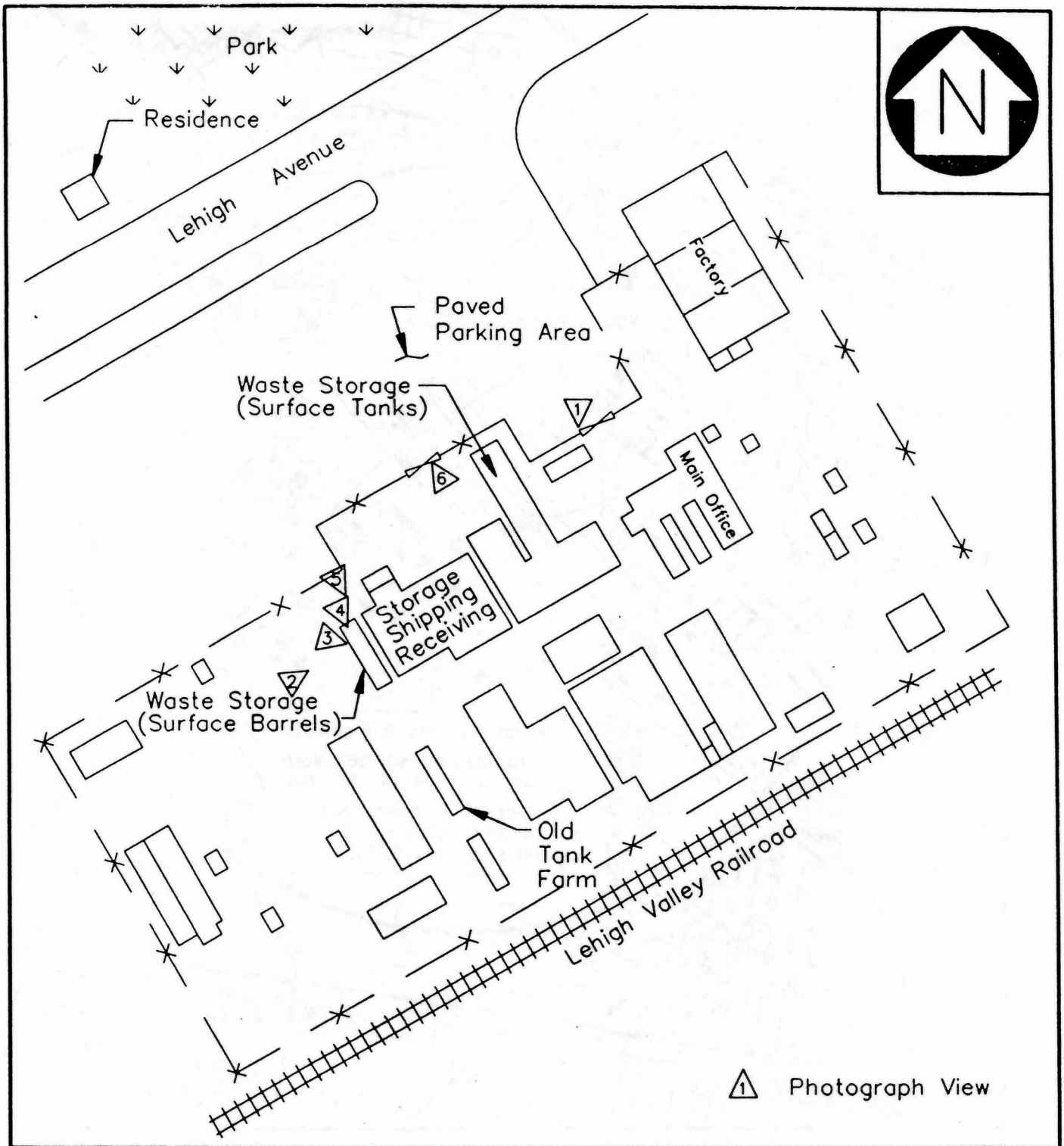


LOCATION MAP

ALCAN POWDER & PIGMENTS
UNION COUNTY, NEW JERSEY

EBASCO ENVIRONMENTAL

FIGURE 1



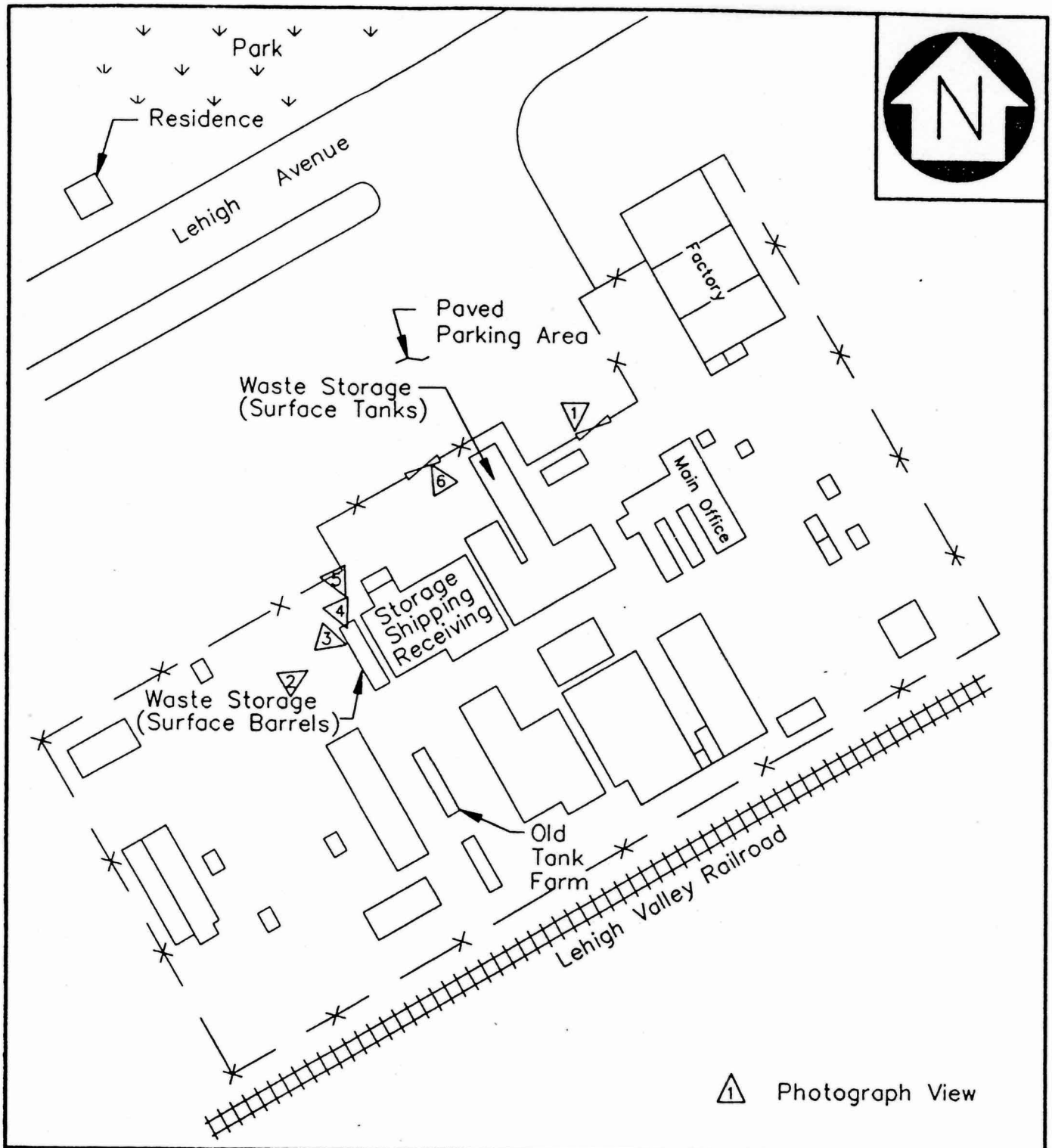
SCALE: NONE

SITE SKETCH

ALCAN POWDER & PIGMENTS
UNION COUNTY, NEW JERSEY

EBASCO ENVIRONMENTAL

FIGURE 2



SCALE: NONE

SITE SKETCH

ALCAN POWDER & PIGMENTS
UNION COUNTY, NEW JERSEY

EBASCO ENVIRONMENTAL

FIGURE 2

FIELD PHOTOGRAPHY LOG SHEET

TE NAME: Alcan Powders & Pigments PAGE 1 OF 3
.S. EPA ID: NJD065815771
ATE: July 10, 1992
ME: 10 AM

IRECTION OF
HOTOGRAPH:

outhwest
EATHER
ONDITIONS:

artly Cloudy

9° F
HOTOGRAPHED BY:

. Sharma
AMPLE ID
applicable):

N/A

ESCRIPTION: View of Main gate & Security building (Photograph #1)

ATE: July 10, 1992

ME: 10:45 AM

RECTION OF
IOTOGRAPH:

ortheast
EATHER
ONDITIONS:

artly Cloudy

)°F
IOTOGRAPHED BY:

Sharma
MPLE ID
applicable):

N/A

ESCRIPTION: View of Barreled waste storage area (SWMU #1) (Photograph #2)

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Alcan Powders & Pigments
U.S. EPA ID: NJD065815771
DATE: July 10, 1992
TIME: 11 AM

DIRECTION OF PHOTOGRAPH:

Southeast
WEATHER CONDITIONS:

Partly Cloudy

70° F
PHOTOGRAPHED BY:

S. Sharma
SAMPLE ID (if applicable):

N/A

DESCRIPTION: View of leaking barrel (contaminated soils) (Photograph #3)

DATE: July 10, 1992

TIME: 11:10 AM

DIRECTION OF PHOTOGRAPH:

Southeast
WEATHER CONDITIONS:

Partly Cloudy

80°F
PHOTOGRAPHED BY:

S. Sharma
SAMPLE ID (if applicable):

N/A

DESCRIPTION: View of SWMU #1 (Photograph #4)

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Alcan Powders & Pigments
U.S. EPA ID: NJD065815771

DATE: July 10, 1992
TIME: 11:15 AM

DIRECTION OF PHOTOGRAPH:

Southeast

WEATHER CONDITIONS:

Partly Cloudy

80° F

PHOTOGRAPHED BY:

S. Sharma

SAMPLE ID (if applicable):

N/A

DESCRIPTION: View of paved area adjacent to Storage,Shipping & Receiving building.(Photograph #5)

DATE: July 10, 1992

TIME: 11:30 AM

DIRECTION OF PHOTOGRAPH:

Northwest

WEATHER CONDITIONS:

Partly Cloudy

80°F

PHOTOGRAPHED BY:

S. Sharma

SAMPLE ID (if applicable):

N/A

DESCRIPTION: View from Storage,Shipping & Receiving area across parking lot to park across Lehigh Ave. (Photograph #6)

REFERENCE #1

Final Report

Site Remediation
Alcan Powders and Pigments
Union, New Jersey Facility

Alcan Aluminum Corporation
Cleveland, Ohio

April 1991

O'BRIEN & GERE

EXHIBIT 5

SPILL HISTORY

SPILL HISTORY

Listed below is a summary of hazardous waste discharges known to have occurred at the Alcan Powders and Pigments facility. Also provided herein with this attachment is a drawing showing the location of each of the spills documented below.

Date of Discharge or Identification of Discharge: May 14, 1982

Description of Discharge Event:
The Process Oil Tank (Tank No. 25) within the concrete diked tank farm was overfilled and mineral spirits escaped through the tank's vent pipe. The mineral spirits flowed from the vent pipe, down the tank wall, along the retaining wall, and out of the tank farm's containment area through an open valve discharging into the soil between the tank farm and the railroad tracks. A pool of mineral spirits was trapped between the plant's fence and the Conrail Lehigh Valley Railroad tracks.

Response and Resolution:
Approximately 900 gallons of free-product was recovered from the pool of mineral spirits between the plant's fence and the Conrail Lehigh Valley Railroad tracks.

Date of Discharge or Identification of Discharge: July 1984

Description of Discharge Event:
Palmitic and stearic acid mixed with mineral spirits was found in a creek to the south-east of the facility.

Response and Resolution:
The creek was boomed and skimmed.

Date of Discharge or Identification of Discharge: September 27, 1985

Description of Discharge Event:
Propane gas leaked from a two-inch underground propane gas line and migrated off-site into a nearby residence on Lehigh Avenue. An explosion occurred on September 27, 1895 which resulted in property damage to the residence.

Response and Resolution:
Alcan Powders and Pigments installed a trench fitted with blowers to vent propane gas. Gas readings within the location on January 6, 1986 were zero.

Date of Discharge or Identification of Discharge: September 21, 1986

Description of Discharge Event:
During the drilling of a monitoring well at the site, mineral spirits were discovered within the subsurface soils.

Response and Resolution:
The NJDEP was notified of the identified contamination and issued a Notice of Violation along with procedures for documenting the cleanup.

Date of Discharge or Identification of Discharge: September 30, 1986

Description of Discharge Event:
Approximately 50 to 60 gallons of naphtha (petroleum distillates) spilled near Tank No. 7.

Response and Resolution:
Spilled material was absorbed using sawdust and "Speedy-Dri". The saturated absorbent material generated during the cleanup was disposed as hazardous waste.

Date of Discharge or Identification of Discharge: August 16, 1989

Description of Discharge Event:
Traces of free product were discovered during the excavation of underground storage tanks (Tank Nos. 5, 17, and 20).

Response and Resolution:
The NJDEP's Bureau of Underground Storage Tanks was notified. Contaminated soil was removed and disposed.

Date of Discharge or Identification of Discharge: August 16, 1989

Description of Discharge Event:
Traces of free product were discovered during the excavation of underground storage tanks (Tank Nos. 21 and 22).

Response and Resolution:
The NJDEP's Bureau of Underground Storage Tanks was notified. Contaminated soil was removed and disposed.

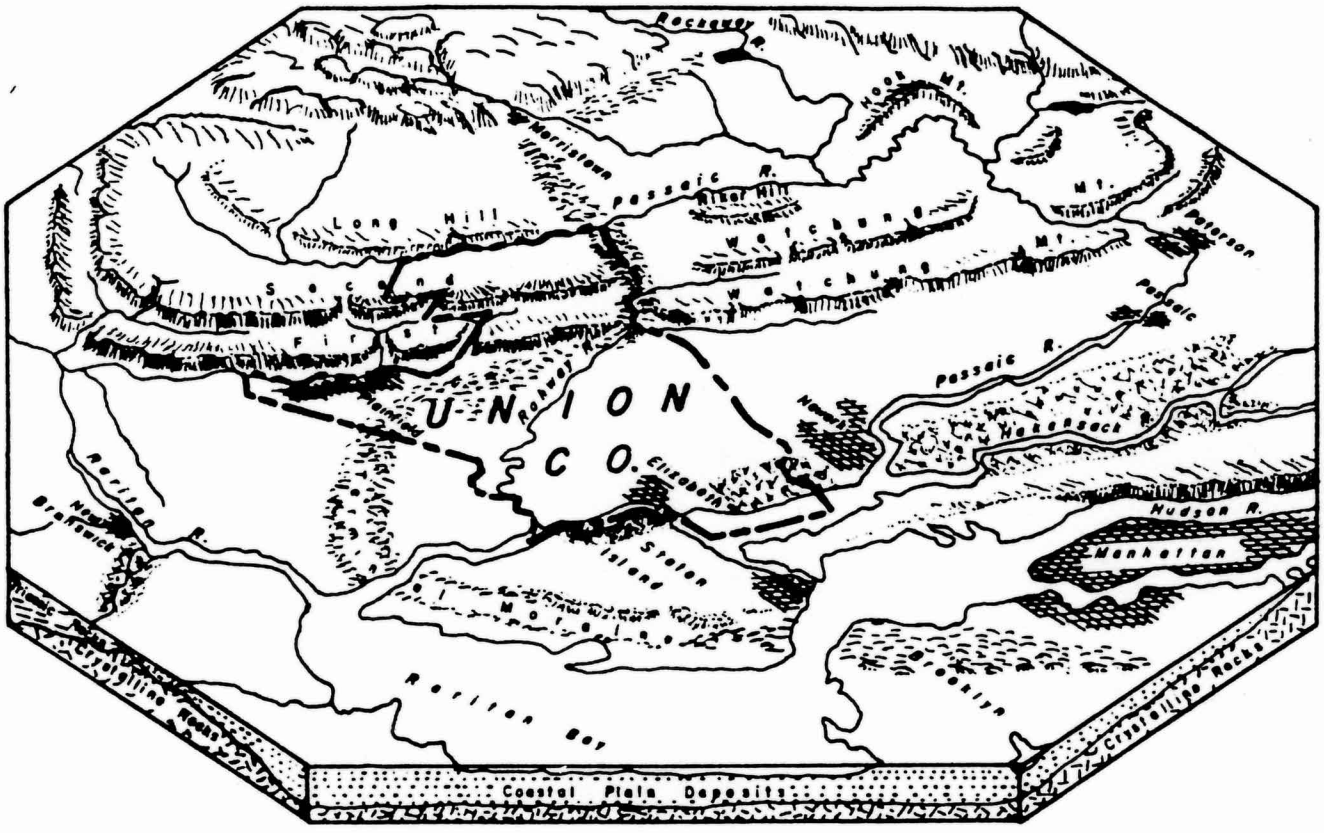
Designed by JWM Drawn by TKP Checked by JWM	1"=30' (30 0 30 60)	no. / DATE / REVISION / INIT.	O'BRIEN & GERE ENGINEERS, INC.	ALCAN POWDERS AND PIGMENTS UNION, NEW JERSEY	GENERAL SPILL HISTORY	FILE no. 3057.110.02F DATE FEBRUARY 1991	G-2

REFERENCE #2

GEOLOGY AND GROUND-WATER RESOURCES OF UNION COUNTY, NEW JERSEY

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 76–73



Prepared in cooperation with

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, DIVISION OF WATER RESOURCES

The rolling plain is broken by two topographic features. A broad irregular ridge with maximum altitudes of about 200 feet, an end moraine of the Wisconsin Glaciation, traverses the western edge of the plain area of the county in a roughly north-south direction. This ridge extends from Summit southward to Fanwood to just east of Plainfield (fig. 3). A second end moraine forms a broad low ridge trending roughly east-west in the area of Hillside and Union Townships and in Kenilworth Borough.

Union County lies within five major drainage basins (fig. 4). The western part of the county is drained by the Passaic River and by Green Brook which is within the Raritan River basin. The central part of the county is largely within the Rahway River basin. The eastern part of the county is within the Elizabeth River basin and the Arthur Kill basin.

Climate

The climate of Union County is largely continental with winds coming predominantly from the interior of North America. The summers are controlled by tropical air masses and the winter by polar continental air masses. From October to April the prevailing winds are from the northwest and from May to September the prevailing winds are from the southwest.

Union County has humid, warm summers, and moderately cold winters. Climatological data has been collected at Elizabeth by the U.S. Weather Bureau since 1894. Average annual precipitation is about 48 inches and the annual average temperature is 53°F. The average growing season or frost-free period is 187 days, from April 19 to October 23.

Population and Economy

The population of Union County as of the 1960 census is 504,255. The county is ranked fourth largest in population and second smallest in land area in the state. The population density as of the 1960 census was 4,910 per square mile. It is exceeded in population density only by Hudson and Essex Counties.

There are 21 municipalities in the county of which 8 are townships, 7 are boroughs, 5 are cities, and 1 is a town.

The economy of Union County is primarily industrial. The principal industrial products and the number of establishments are listed below:

Methods of this Investigation

An inventory was made of public, industrial and domestic wells tapping the Brunswick Formation, Watchung Basalt and Pleistocene deposits. The well records are presented in Table 4 and well locations are shown in figure 2.

Geologic information was obtained from drillers' well logs and representative well logs are given in Table 6. A bedrock map on top of the Brunswick Formation and Watchung Basalt was constructed from well log information and is shown in figure 2. The thickness of the Pleistocene deposits can be determined from figure 2 by subtracting the bedrock elevation from the surface elevation.

Chemical analyses of ground water were made to identify the characteristic chemical and physical properties of the ground water in Union County. The chemical analyses of water samples from 59 wells are presented in Table 5 and their location is shown on figure 2.

Acknowledgments

The author wishes to thank well drillers, State, municipal, and industrial officials, and private individuals who supplied data on which this report is based. Acknowledgment is made for the records and logs of wells that were furnished from the files of the New Jersey Bureau of Geology and Topography and to Elizabethtown Water Company for making the water quality analysis available to the author. The cooperation of many individuals who permitted the use of their wells for water-level observation and collection of water samples is gratefully acknowledged.

GEOGRAPHY

Topography and Drainage

Union County is in the Piedmont Plateau, one of eight major physiographic divisions of the United States. The major topographic features of the Piedmont Plateau in Union County are: (1) the Watchung Mountains, two basaltic ridges with maximum altitudes of about 550 feet, trending parallel to the northwestern boundary of the county; and (2) a gently rolling plain sloping from about 100 to 150 feet at the eastern side of the Watchung Mountains to sea level at Arthur Kill.

The Watchung Mountains extend from Passaic County through Essex and Union Counties and terminate in Somerset County. The ridges are underlain by thick sheets of basaltic lava flows intercalated with the shales and sandstones of the Newark Group. These ridges trend generally northeast-southwest and have steep, rock escarpments on the east and gentle slopes on the west.

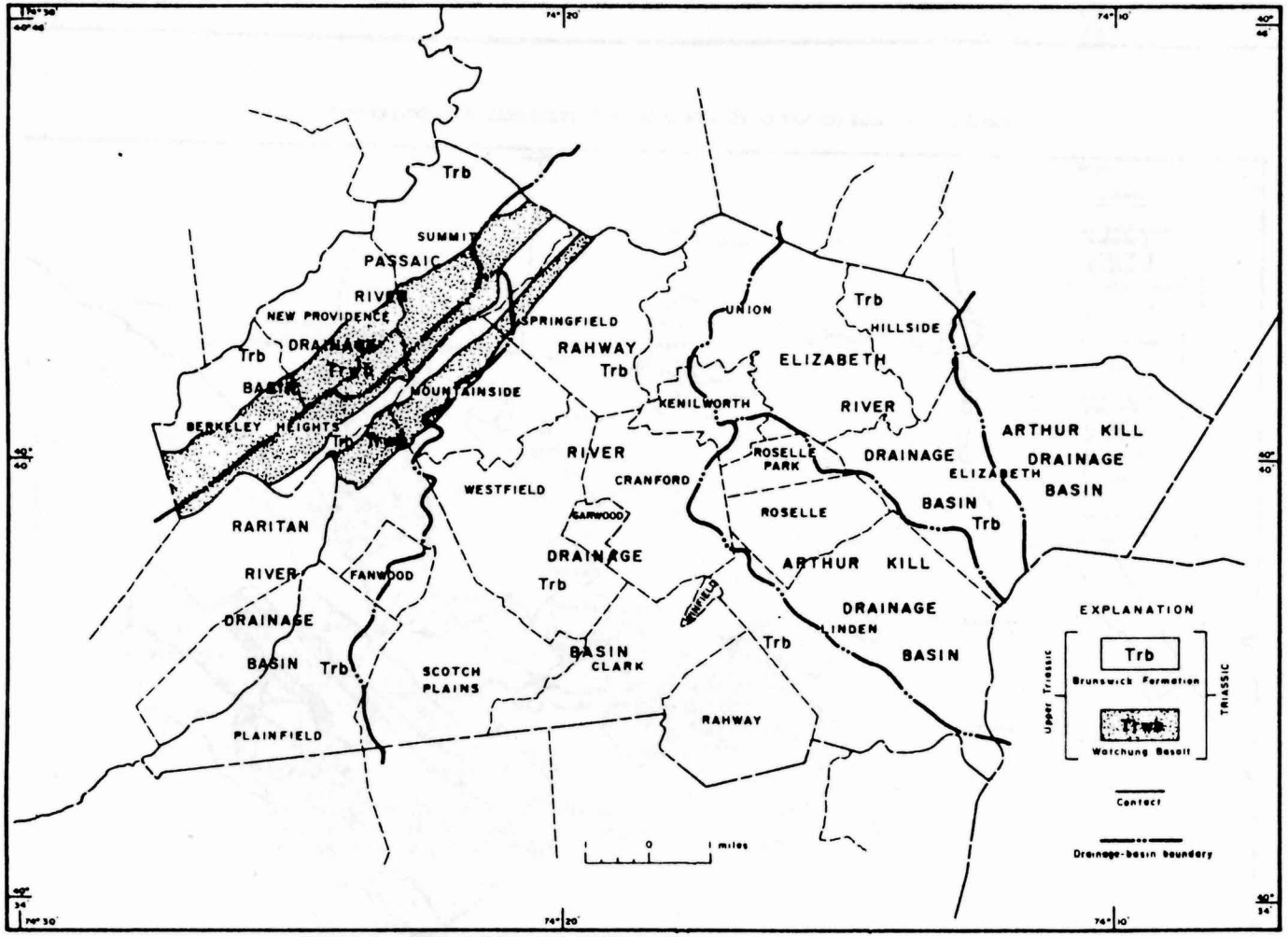


FIGURE 4.--GENERALIZED MAP SHOWING BEDROCK GEOLOGY AND DRAINAGE BASINS OF UNION COUNTY, NEW JERSEY.

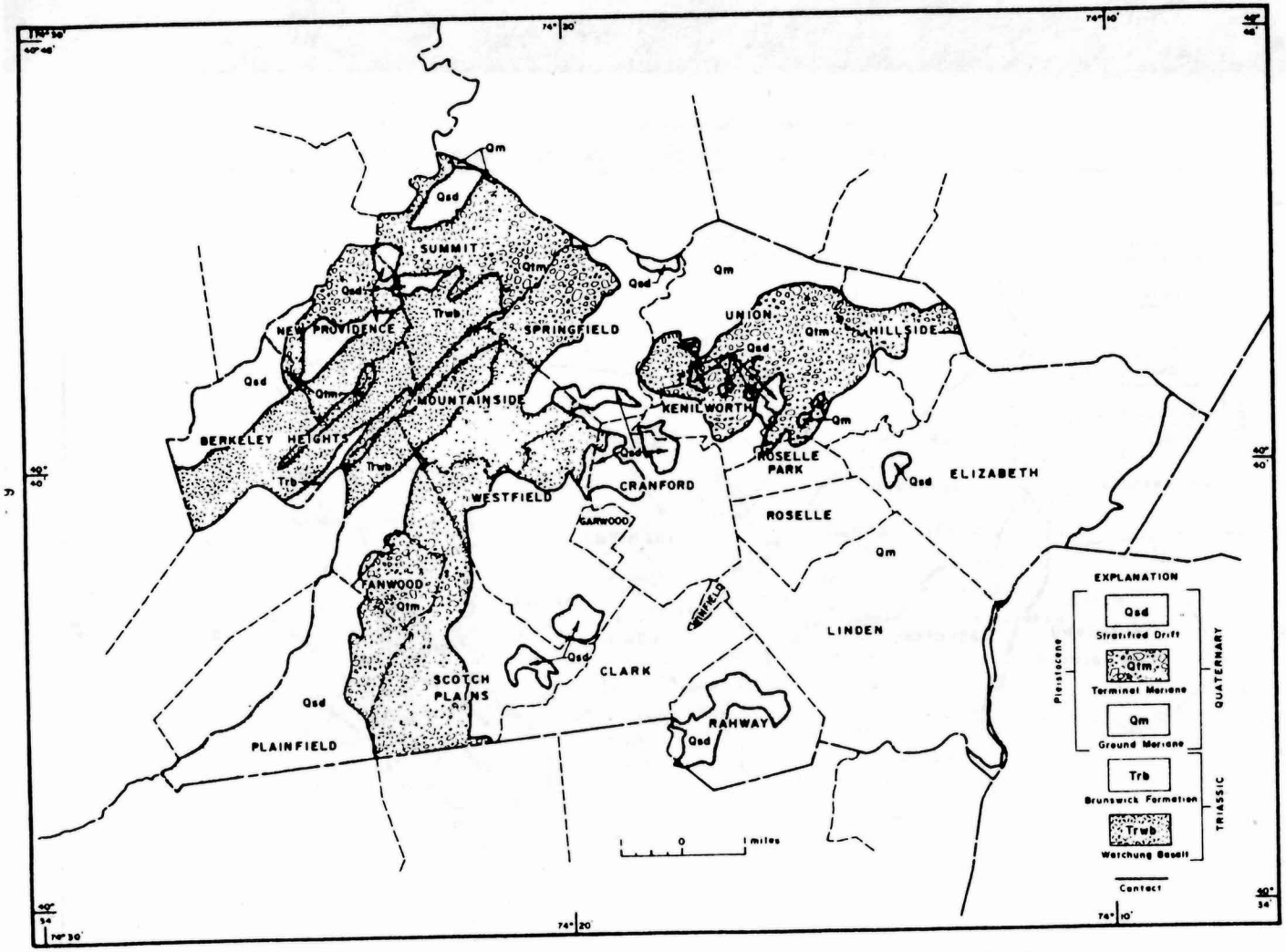


FIGURE 3.--GENERALIZED SURFICIAL GEOLOGIC MAP OF UNION COUNTY, NEW JERSEY.

Industrial Products	Number of Establishments
Chemicals and allied products	104
Fabricated metal products	226
Machinery, except electrical	275
Food and kindred products	71
Miscellaneous manufacturing	77
Printing and publishing	113
Furniture and fixtures	34
Instruments and related products	25
Textile mill products	14
Stone, clay, and glass products	26
Rubber and plastics products	63
Total	1,424

(New Jersey Department of Environmental Protection, 1967)

GEOLOGY

Newark Group

During the Late Triassic Epoch downfaulting produced a series of northeast-southwest trending basins in the Piedmont Plateau from Nova Scotia to North Carolina. Sedimentary and associated igneous rocks of Triassic age occupy the downfaulted basins and are known as the Newark Group. In New Jersey the Newark Group crops out in a band 16 to 30 miles wide trending northeast-southwest from the Delaware River to the Hudson River (fig. 1). Union County lies entirely within this band.

The Newark Group in New Jersey contains 15,000 to 20,000 feet of non-marine shales, mudstones, sandstones, conglomerates, and basic igneous rocks that unconformably overlie rocks of Paleozoic and Precambrian age. The sedimentary rocks of the Newark Group were largely derived from Paleozoic and Precambrian rocks to the southeast and deposited in a non-marine intermontane basin (Van Houten, 1965). During Triassic time the sedimentary rocks were intruded by a diabase sill, dikes, and covered by several flows of basalt.

The Newark Group underlying Union County consists of the Brunswick Formation and Watchung Basalt. The generalized geologic map (fig. 4) shows the areal distribution of the Triassic rocks underlying Union County. Figure 5 is a generalized section showing the geology and structure of Union County.

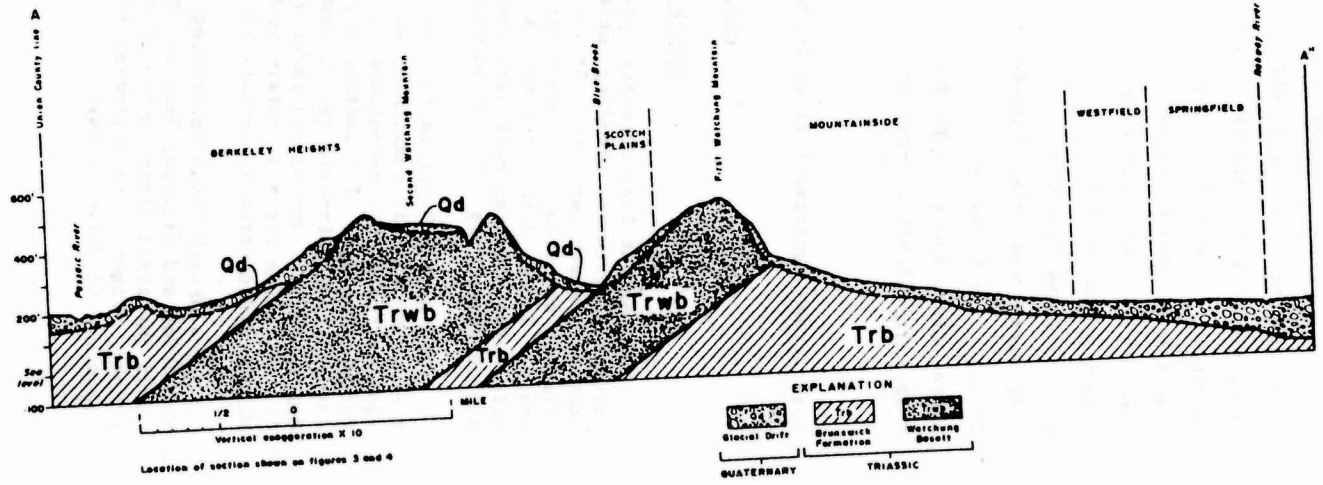


FIGURE 5.--GENERALIZED GEOLOGIC SECTION ACROSS UNION COUNTY, NEW JERSEY.

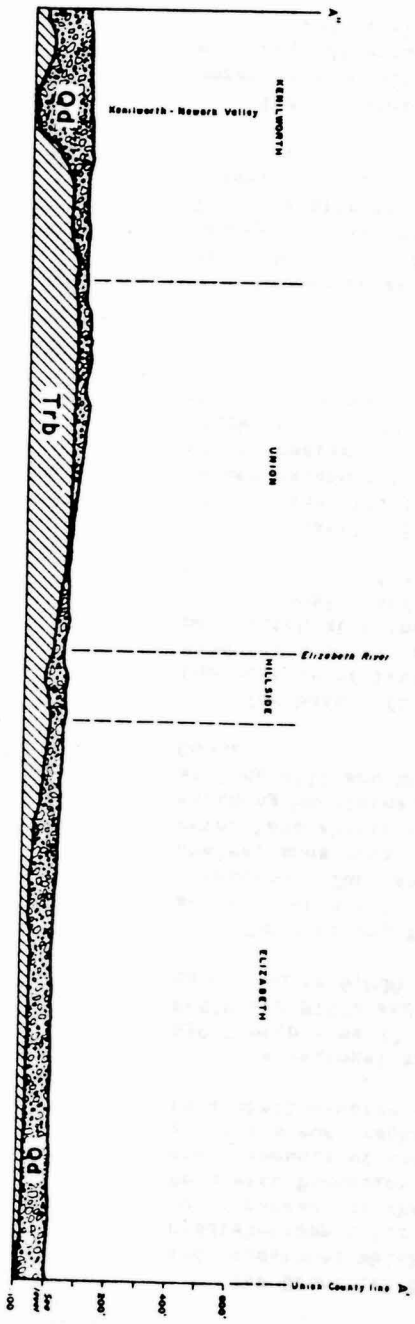


FIGURE 5.--CONTINUED

The Brunswick Formation consists of thin-bedded shales, mudstones, and sandstones which range in color from reddish-brown to gray. The reddish-brown color originates from reworked hematite which comprises 5 to 10 percent of the formation (Boch, 1959). The minerals of the Brunswick Formation include quartz, illite, muscovite, feldspar, and small amounts of calcite and gypsum. Primary structures such as ripple marks and mud cracks indicate that the Brunswick Formation was deposited in a shallow-water environment.

The regional strike of the Brunswick Formation in Union County is N50°E with dips 9° to 13°NW. The major joint sets strike approximately N45°E and N75°W and both sets have a vertical dip. The thickness of the formation is 6,000 to 8,000 feet.

The Watchung Basalt consists of three extensive basaltic lava sheets that are intercalated with the sedimentary rocks of the Brunswick Formation. The basalt flows are more resistant to erosion than the shales, mudstones, and sandstones and form prominent ridges. Two of the three lava sheets occur in Union County and form the First and Second Watchung Mountains. The third sheet forms a discontinuous ridge known as Long Hill and Hook Mountain in Morris County to the west of Union County.

The basalt flows are volcanic extrusive rocks which were formed by the outflow of lava onto the land surface. Rapid cooling of the flows produced a dense, aphanitic rock. Phenocrysts are present in the ground mass which give the basalt a porphyritic texture. The phenocrysts are usually augite and in some cases feldspar. The ground mass for the most part consists of augite and feldspar.

The basalt sheets vary in thickness from less than 300 feet in parts of the Long Hill flow to a maximum of about 1,200 feet in parts of the Second Watchung Mountain. The Second Watchung Mountain is a double flow sheet separated by a thin section of the Brunswick Formation. The thickest flow sheet is the upper flow of the Second Watchung Mountain which has a maximum thickness of about 800 feet.

Quaternary Deposits

Unconsolidated sediments deposited by glaciers or by glacial meltwater during the Pleistocene Epoch mantle the bedrock surface in Union County. These deposits consist of clay, silt, sand, gravel, and boulders. They are glacial, glaciolacustrine (deposited by glacial meltwater in lakes), or glacial fluvial (deposited by glacial meltwater in streams) in origin.

The Pleistocene sediments fall into three general classes: (1) end moraine--a moraine jointed across the course of a glacier at its farthest advance; (2) ground moraine--the material carried forward in and beneath the ice and finally deposited from its under surface; and (3) stratified

drift--deposits from glacial meltwater exhibiting both sorting and stratification. The stratified drift includes lacustrine (deposited in lakes) and fluviatile (deposited in streams) sands and clays.

Figure 3 is a surficial geologic map of Union County showing the extent of the end moraine, ground moraine, and stratified drift. West of the end moraine near Scotch Plains and Plainfield, stratified drift forms an outwash plain (fig. 3).

Before the last glaciation the rivers draining Union County cut deep valleys into the Brunswick Formation (fig. 2). Subsequently the valleys were filled and buried by glacial material. The thickness of the glacial deposits is controlled largely by the underlying bedrock topography. Figure 6 consists of three sections showing the altitudes of the bedrock valley floor and thickness of Pleistocene deposits in the bedrock valleys. These buried channels underlie parts of Hillside, Union, Springfield, Clark, and Scotch Plains Townships, and the Boroughs of Mountainside, New Providence and Kenilworth and the Cities of Summit and Rahway.

The Pleistocene sediments in the bedrock channels consist of unstratified and stratified clay, silt, sand, and gravel. Only the sand and gravel deposits of the stratified drift will yield large quantities of water to wells.

Deposits of Holocene (Recent) age cover only small areas and include river alluvium, and eolian deposits.

The stratigraphic units in Union County and their geologic and hydrologic characteristics are given in Table 1. Table 6 contains representative well logs indicating the variations in the lithologies of the geologic units.

GROUND WATER HYDROLOGY

Introduction

Water is continually being exchanged in a circulatory pattern between the earth and the atmosphere. In general, the amount of precipitation ultimately determines the amount of water available for man's use. Some of the precipitation that falls on land evaporates where it falls, some is absorbed by plants that later transpire the water back to the atmosphere, some flows overland to streams, and some infiltrates into the ground to become ground water. The ground water is discharged to streams, and streams flow to the oceans where the water can be evaporated back to the atmosphere.

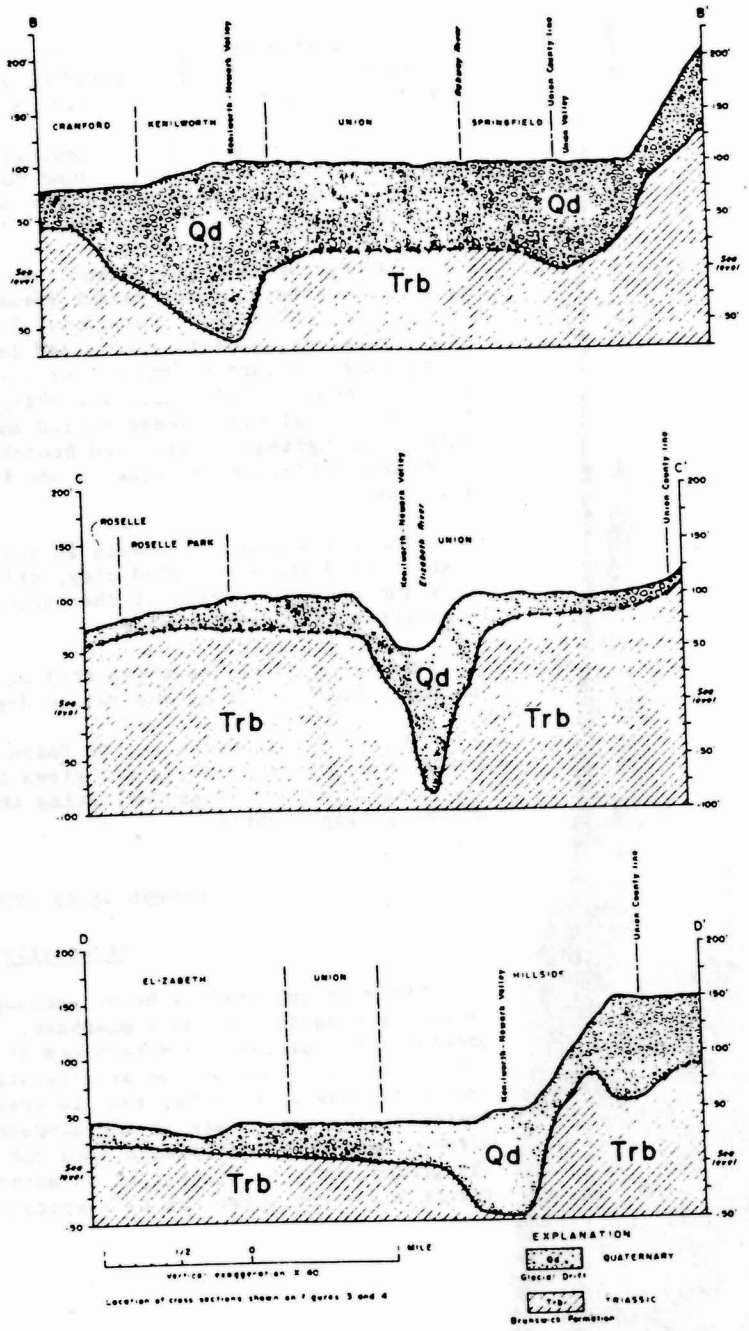


FIGURE 6.--GEOLOGIC SECTIONS SHOWING THE BURIED CHANNELS IN UNION COUNTY, NEW JERSEY.

Table 1.--Geology and hydrology of the rock units in Union County, New Jersey

Era	Period	Series	Formation or lithologic unit	Thickness (feet)	Lithology	Hydrologic characteristics
Cenozoic	Quaternary	Holocene	alluvium	0-25	Sand, silt, and mud in and along river channels.	Relatively impermeable deposits; retard intrusion of saline water through river beds.
			eolian deposits	0-10	Sand	Above water table; high rate of infiltration.
		Pleistocene	unstratified drift (till)	0-200	Unstratified clay, sand and gravel; reddish brown in color. Forms the ground and end moraine deposits. Deposited by glaciers.	Because of low permeability, it is not an important aquifer in the County.
			stratified drift	0-60	Sand and gravel lenses which are stratified. Occurs as lenses in the till in the bedrock channels and interbedded with till in the end moraines. Deposited by water.	Important as an aquifer in the City of Rahway and in Union, Hillside and Springfield Townships and in Kenilworth Borough. At the City of Rahway and Hillside Township wells induce recharge from rivers.
					Unconformity	
Mesozoic	Triassic	Upper Triassic	Newark Group: Brunswick Formation	6,000-8,000	Interbedded, soft red shales, mudstones, and sandstones. Adjacent to the Watchung Basalt it is altered to a hornfels.	Most extensive and most important aquifer in Union County. Water stored in and transmitted along fracture and joint systems which decrease in number and volume with depth. Both artesian and water-table conditions exist.
			Watchung Basalt	300-800	Basaltic lava sheets intercalated with the sedimentary rocks of the Newark Group. Two of the sheets crop out in Union County. The basalt is a dense, aphanitic, extrusive rock. Augite and feldspars are the chief minerals.	Minor aquifer in the county. Well yields are low to moderate.

Nearly all the ground water in Union County originates from local precipitation, which averaged 46 inches per year during the period from 1921 to 1950 (Parker and others, 1964, plate 3). Average annual runoff, which includes overland runoff and ground-water discharge to streams, ranged from 18 to 22 inches (1921-50) in Union County (Parker and others, 1964, plate 12). Average annual water loss caused by evaporation and transpiration was 26 inches (1921-50) in Union County (Parker and others, 1964, plate 4).

Recharge to the zone of saturation is supplied by infiltration from precipitation through the soil and percolation to the water table. The amount of water that reaches the water table varies throughout the year and is controlled by type, amount, and intensity of precipitation, slope of land surface, geology, soil moisture, vegetative cover and temperature.

The intensity and amount of rainfall affects the amount of recharge to the aquifer. Much of the water from a high-intensity rainfall may run off directly to streams instead of percolating down to the aquifer whereas gentle rains of long duration supply considerable ground water recharge.

Areas with steep slopes have a more rapid runoff rate and recharge in general is less than in areas which have gentle slopes and consequently less rapid runoff.

Ground-water recharge may occur along stream banks by influent seepage from the surface-water bodies after a heavy rainfall. The stream level rises at a faster rate from precipitation than does the water table. The water table slope is temporarily reversed and seepage of surface water to the aquifer occurs. This water is bank storage and is released to the stream once the surface level falls below the water table.

In some areas, wells located near streams that are in hydraulic continuity with the aquifer reverse natural gradients when they are being pumped and induce recharge from the stream to the aquifer.

Water-level Fluctuations

The U.S. Geological Survey maintains eight observation wells in the Brunswick Formation in Union County. The hydrographs of three of the observation wells are shown in figure 7.

The hydrograph of the Kenilworth well No. 4 (fig. 7A) shows the seasonal fluctuations of water levels in the area. The generally lower water levels of the period 1953-60 as compared with the period 1943-52 is a result of increased pumpage that occurred during this period. The decline in water levels starting in 1960 (fig. 7A) is attributed to the below average precipitation, when the northeastern states experienced a prolonged drought. The rapid recovery from the low point reached in July 1965 is attributed to the return of normal or above-normal precipitation.

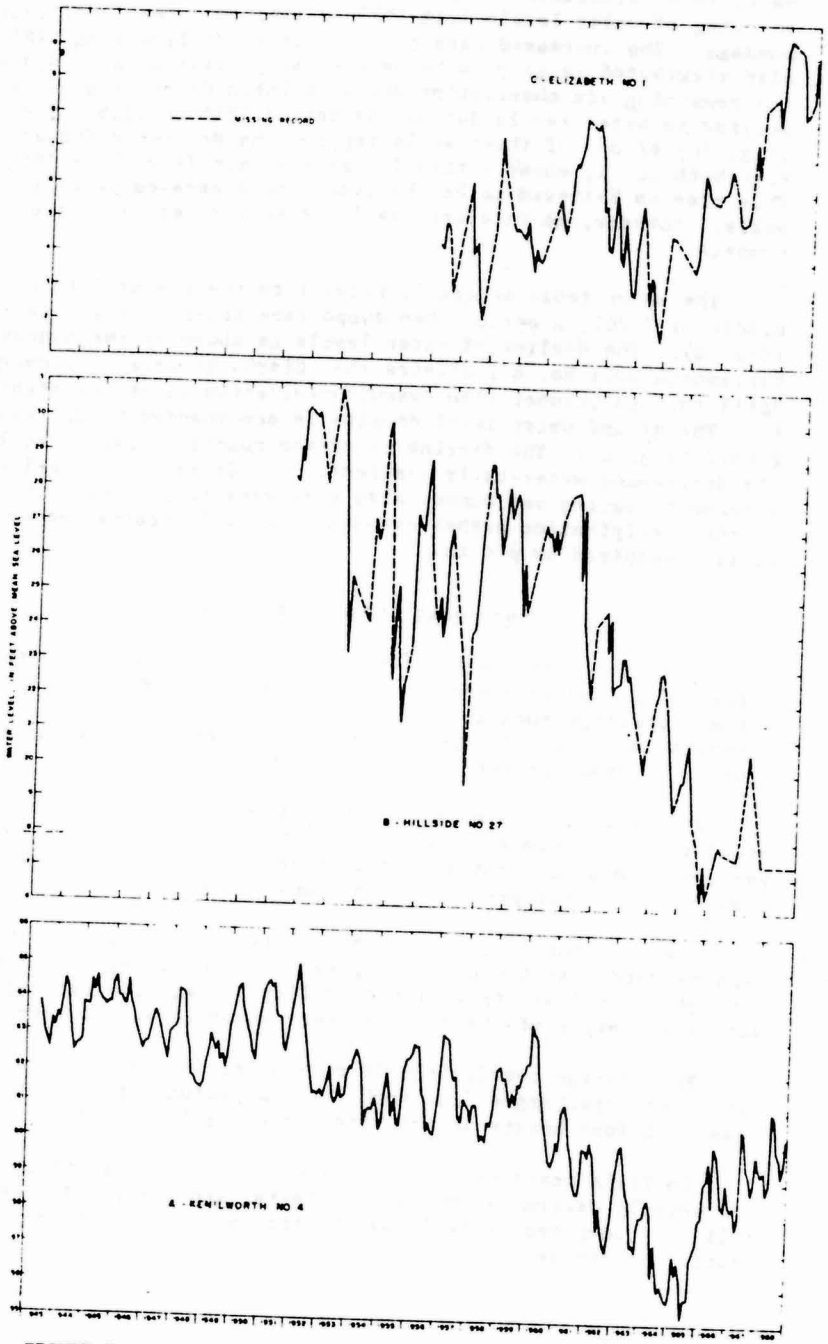


FIGURE 7.--HYDROGRAPHS OF THREE OBSERVATION WELLS IN UNION COUNTY, NEW JERSEY.

The hydrograph of the Hillside well No. 27 (fig. 7B) shows seasonal water level fluctuations due to pumpage in the area. The general lowering of water levels from 1953 to 1961 is a result of increased pumpage. The increased rate of water level decline from 1961 to 1965 is also attributed largely to below-average precipitation. Hydrographs of the remaining six observation wells in Union County show no significant decline in water levels during the period 1956 to 1968. The hydrograph (fig. 7C) of one of these wells tapping the Brunswick Formation, Elizabeth No. 1, shows a rise in water levels from about 1963 to 1968. This rise is believed to be the result of decreased pumpage from nearby wells. However, no data are available to indicate such changes in pumpage.

The water table generally rises from the end of October to the middle of April, a period when evapotranspiration is at its lowest (fig. 8). The decline of water levels as shown by the hydrograph of Kenilworth well No. 4 indicates that discharge exceeds recharge from April through October when evapotranspiration is at its highest (fig. 8). The ground-water level decline is accompanied by decreasing stream runoff (fig. 8). The decline in stream runoff is partly controlled by the decreasing water-table gradient. The decrease in overland flow to streams in spring and summer also decreases total runoff, because most of the precipitation either evaporates or infiltrates the soil, where it is transpired by plants.

Hydrologic Properties of Rocks

Porosity is the ratio of the volume of pore space in a rock to its total volume and is expressed as a percentage. Porosity includes both primary openings such as intergranular pore space in the Pleistocene deposits and secondary openings such as joints and fractures in the Brunswick Formation and Watchung Basalt.

The permeability of a rock is its capacity to transmit water. The coefficient of permeability is the rate of flow of water, in gallons per day through a cross-sectional area of 1 square foot under a hydraulic gradient of 1 foot per foot at a temperature of 60°F.

The coefficient of transmissibility of an aquifer is the rate of flow of water, at the prevailing water temperature, in gallons per day, through a vertical strip of the aquifer 1 foot wide extending the full saturated height of the aquifer under a hydraulic gradient of 100 percent.

The storage coefficient of an aquifer is the volume of water in cubic feet discharged from each vertical column of the aquifer with a base of 1 foot square as the water level falls 1 foot.

In field practice, the coefficient of transmissibility and storage are usually determined by aquifer tests, and the coefficient of permeability is computed by dividing the transmissibility by the saturated aquifer thickness.

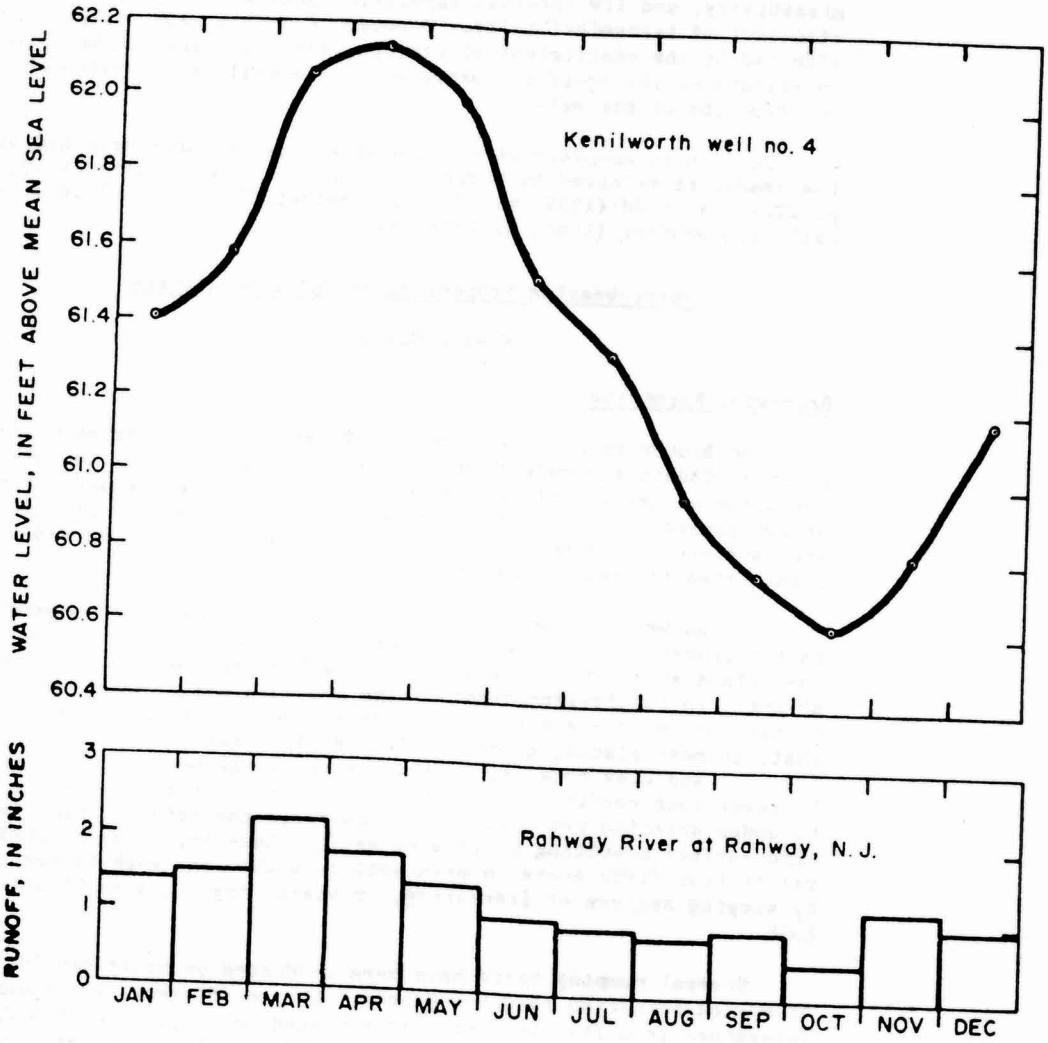


FIGURE 8.--AVERAGE MONTHLY WATER LEVELS IN KENILWORTH NO. 4 (1943-69) AND MEAN MONTHLY RUNOFF OF RAHWAY RIVER AT RAHWAY, N.J. (1931-50).

The specific capacity of a well, the rate of yield per unit drawdown for some time interval, generally gallons per minute per foot of drawdown, can be a good measure of the transmissibility of the rocks. High specific capacities generally suggest a high coefficient of transmissibility, and low specific capacities generally suggest a low coefficient of transmissibility. However, specific capacity also is affected by the coefficient of storage, the thickness and boundary conditions of the aquifer penetrated by the well, and development and construction of the well.

For a more complete discussion of general ground-water hydraulics, the reader is referred to Theis (1935, p. 519-524), Ferris (1949, p. 226-272), Todd (1959, p. 77-114), DeWiest (1965, p. 161-183), and Davis and DeWiest (1966, p. 156-374).

Water-bearing Properties of Major Rock Units

Newark Group

Brunswick Formation

The Brunswick Formation of Late Triassic age is the major aquifer in Union County and underlies most of the county. Water in this formation occurs in joints and fractures. These joints and fractures become progressively tighter and fewer with increasing depth below land surface. Only moderate quantities of water can be stored or transmitted in these fractures.

Ground water occurs under both unconfined and confined conditions in the Brunswick Formation. Unconfined ground water occurs mainly in the upland areas where overlying unconsolidated sediments are thin or absent. In the lowland areas in the southern and eastern part of Union County the rocks are mantled by unconsolidated Pleistocene deposits that, in most places, contain silt and clay beds. In the lowland areas the silt and clay beds may confine water in the underlying rocks. Wherever such confinement occurs, water beneath the impermeable layers is under artesian pressure. In a few areas the artesian head is above land surface resulting in flowing wells. Locally, artesian conditions result from differences in permeability within the rock layers caused by varying degrees of fracturing, or weathering, or a combination of both.

Several pumping tests have been conducted on wells tapping the Brunswick Formation in Union County. The coefficient of transmissibility determined from five of these tests ranged from 5,900 to 25,400 gpd per ft; most of the values lie between 15,000 and 25,000 gpd per ft. The average coefficient of storage computed from these tests is about 0.00005.

Results of pumping tests indicate that the Brunswick Formation is anistropic; that is, its ability to transmit water is not equal in all directions. The greatest drawdowns caused by pumping are observed in wells aligned along the strike of the beds with respect to the pumping well. The smallest drawdowns are observed in wells aligned transverse to the strike (Vecchioli, 1967). These pumping test observations have been interpreted to indicate that joints and factures which strike parallel to the strike of the bedding are better developed and interconnected than joints and fractures which strike in other directions. Therefore, minimum interference between pumping wells in well fields tapping the Brunswick Formation can be achieved by aligning the wells across the strike of the beds rather than parallel to the strike.

The average reported yield of 230 public-supply, industrial, and commercial wells (table 4) tapping the Brunswick Formation is 200 gpm; yields range from 12 to 870 gpm. A better indication of the potential yield of properly located and developed wells tapping the Brunswick Formation can be obtained from analysis of yields of large diameter (10 inch or greater) wells. The large diameter wells, generally the deeper wells, represent attempts to develop the maximum supply of water. The average yield of 109 large diameter wells (table 4) is 310 gpm; yields range from 23 to 870 gpm.

The distribution of well yields is as follows:

Yield (gpm)	230 Wells	109 Large Diameter Wells
0 - 50	18	2
51 - 100	42	9
101 - 150	36	8
151 - 200	32	14
201 - 250	25	10
251 - 300	20	13
301 - 350	16	15
351 - 400	10	7
401 - 450	6	6
451 - 500	9	9
501 - 550	10	10
551 - 600	2	2
600	4	4

...the cumulative frequency distribution ...e Brunswick Formation. It can be seen on the ...of the 230 wells have yields equal to or less ...ent of the large diameter wells have yields equal ...00 gpm. Many of the higher yielding wells occur where ...mation is overlain by relatively thick, saturated ...s that readily pass water downward into the fractures in ...formation.

...ecific capacities of 205 wells (6 to 12 inches in diameter) ...wick Formation range from 0.04 to 25 and average 3.5 gpm ...-of drawdown; 14 of the wells have specific capacities greater ...10 gpm per foot of drawdown. The depths of the wells range from ...to 1,108 feet and average 387 feet.

Figure 10 is a cumulative frequency distribution graph of specific capacities of wells tapping the Brunswick Formation in Union County. In figure 10, specific capacities are related to the well diameter. The larger diameter wells have the higher specific capacities. Median specific capacities are 1.7 for 6 and 8-inch diameter wells, 2.0 for 10 inch diameter wells and 3.1 for 12 inch and larger diameter wells. The higher specific capacities in the larger diameter wells can be attributed to better well development, well site selection and decreased well entrance losses.

In table 2, specific capacities are listed in percentile on the basis of depth of well drilled below land surface. In order to minimize the effect of well diameter on specific capacity, separate listings for larger and smaller diameter wells are given. Wells between 200 and 600 feet deep, in general have higher specific capacities than wells of shallower or greater depths. This relationship suggests that the best water-producing zones in the Brunswick Formation are encountered between depths of 200 and 600 feet. Below 600 feet the fractures and joints are less enlarged and generally drilling to greater depths will not produce significantly greater well yields.

Wells tapping the Brunswick Formation generally draw water from several water-bearing zones. In areas where the rocks are exposed or covered by a thin layer of unconsolidated sediments the shallow water-bearing zones contain unconfined water to a depth of about 200 or 300 feet. If wells penetrate to depths between 200 and 600 feet one or more confined zones of greater permeability are intercepted. The wells that are drilled between 200 to 600 feet in general have the greatest yields.

Watchung Basalt

The Watchung Basalt is a minor aquifer and underlies the western edge of Union County. In this formation vesicles add primary porosity to the secondary porosity developed from the joints and fractures. However, all these openings constitute only a small part of the total volume of the basalt and their capacity to store and transmit water is poor.

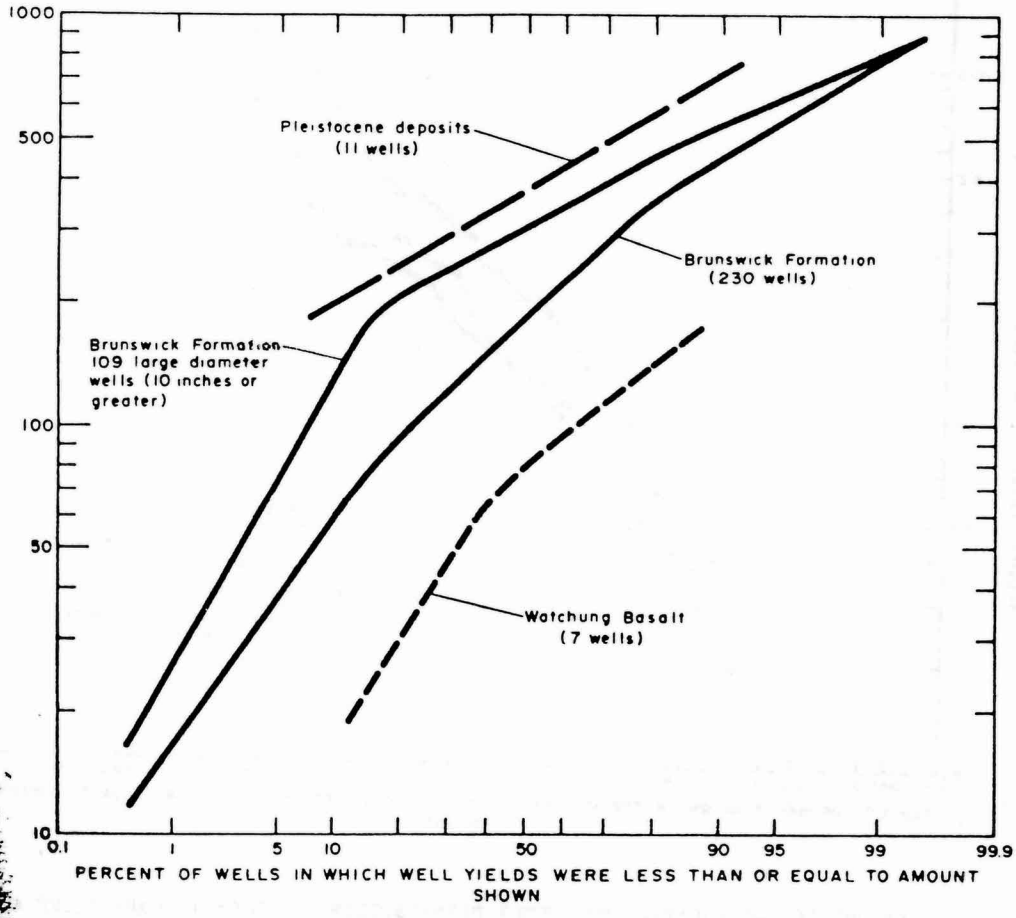


FIGURE 9.--CUMULATIVE FREQUENCY DISTRIBUTION OF YIELDS OF WELLS PENETRATING THE BRUNSWICK FORMATION, WATCHUNG BASALT AND PLEISTOCENE DEPOSITS.

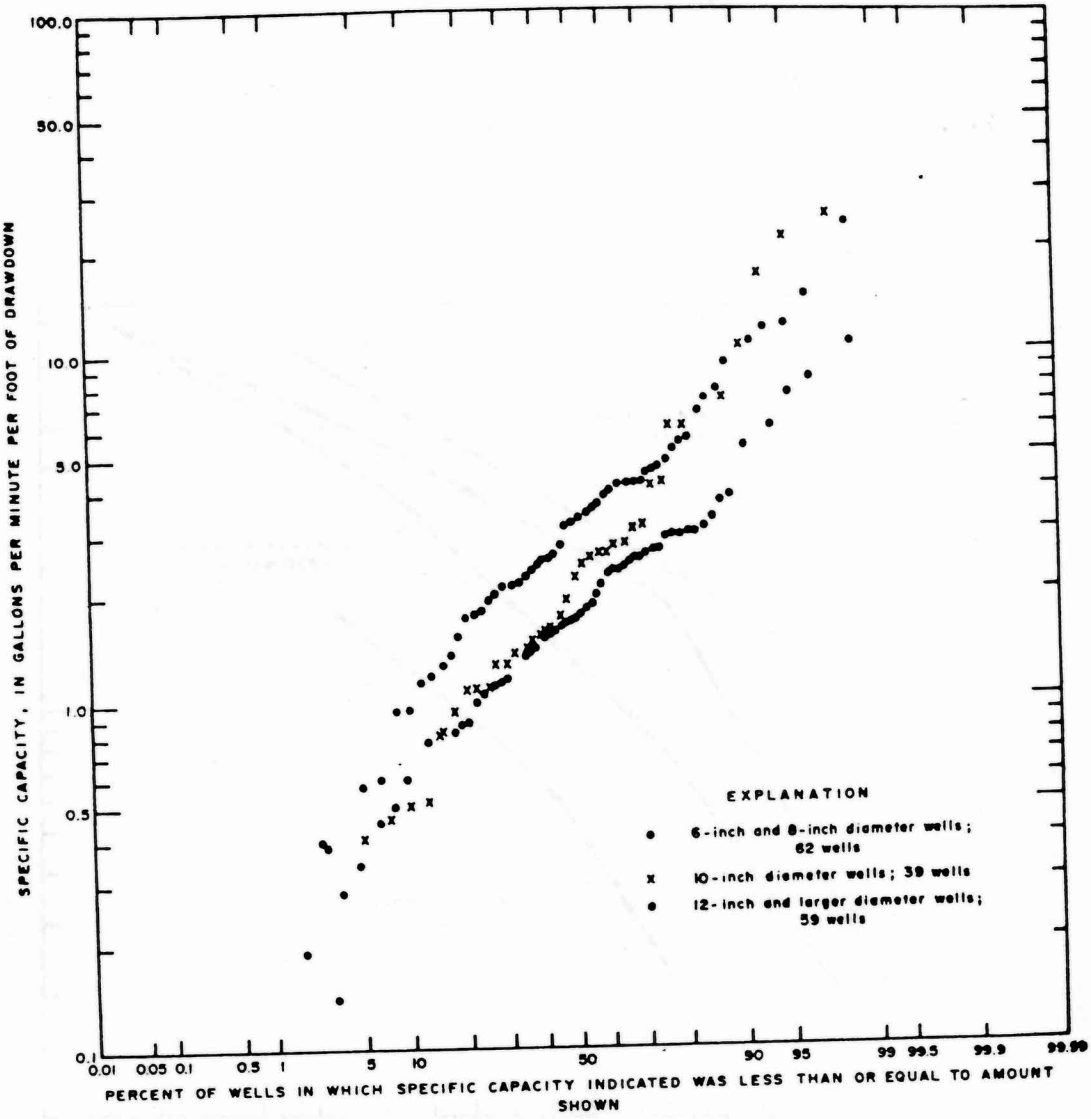


FIGURE 10.--CUMULATIVE FREQUENCY DISTRIBUTION OF SPECIFIC CAPACITIES OF WELLS PENETRATING THE BRUNSWICK FORMATION GROUPED ACCORDING TO WELL DIAMETER.

Table 2.--Specific Capacities of Wells Tapping the Brunswick Formation.

A.--6 and 8 inch diameter wells

Well Depth (feet)	10 Percentile	25 Percentile	Median	75 Percentile	90 Percentil
100 - 199 (4 wells)	-	-	2.3	-	-
200 - 299 (20 wells)	1.1	1.3	2.2	3.0	6.7
300 - 399 (16 wells)	1.1	1.3	2.4	3.0	6.9
400 - 499 (11 wells)	.8	1.4	1.6	1.9	2.5
500 - 599 (7 wells)	.7	.8	1.0	2.8	5.8
600 and greater (4 wells)	-	-	1.5	-	-

B.--10 inch and larger diameter wells

100 - 199 (2 wells)	-	-	-	-	-
200 - 299 (2 wells)	-	-	-	-	-
300 - 399 (29 wells)	.5	1.5	3.1	4.7	12.0
400 - 499 (22 wells)	1.3	2.1	4.3	6.9	11.5
500 - 599 (23 wells)	1.1	1.4	2.4	4.4	11.0
600 and greater (14 wells)	.9	1.1	2.1	2.8	4.3

quantities of water. Reported yields of seven industrial and commercial wells (Table 4) range from 20 to 164 gpm and average 85 gpm. The distribution of the yields is as follows:

Yields (gpm)	Number of Wells
0 - 50	2
51 - 100	3
101 - 150	1
151 - 200	1

It can be seen on the cumulative frequency distribution graph (fig. 9) that 50 percent of the wells have yields equal to or less than 80 gpm.

Specific capacities of the wells in the basalt range from 0.24 to 2.5 and average 1.23 gpm per foot of drawdown.

Pleistocene Deposits

Only sand and gravel aquifers of the stratified drift contain sufficient quantities of water to warrant consideration of their water-bearing properties. The most productive artesian and semi-artesian aquifers of the stratified drift in Union County occur as valley-fill deposits in channels that were cut into the bedrock before the last glaciation.

Areas of greatest thickness of valley-fill material and the altitude of the deepest bedrock valleys are shown below.

Valley	Location	Thickness of valley-fill material (feet)	Altitude of bedrock channel bottom (feet)
Kenilworth-Newark Valley	Newark	230	-220
	Hillside	102	-52
	Union	131	-78
	Kenilworth	180	-90
Summit Valley	Summit-New Providence	223	+17
Union Valley	Union-Springfield	91	-3
Rahway	Rahway	56	-26
	Scotch Plains	70	-10

confined conditions. Unconfined ground water occurs where sand and gravel deposits are not covered by clay, silt, or glacial till. These sand and gravel deposits do not yield large quantities of water as they are generally less than 30 feet thick and are not areally extensive. The unconfined aquifers are recharged directly from precipitation on the outcrop area. Confined and semiconfined ground water occurs where sand and gravel deposits have been covered by lacustrine clay or silt, or by glacial till. These coarse deposits are largely confined to the buried valleys (figs. 2 and 6) so they are not visible at the surface and, therefore, their regional extent and distribution are not readily apparent. The confined and semiconfined aquifers are recharged by leakage through overlying confining beds. Some recharge may also be derived from the underlying and adjacent Brunswick Formation.

Reported yields of 11 wells, (table 4) tapping the stratified drift sand and gravel deposits, range from 180 gpm to 690 gpm and average 394 gpm. The distribution of the well yields is as follows:

Yields (gpm)	Number of Wells
100 - 200	1
201 - 300	2
301 - 400	5
401 - 500	1
501 - 600	0
601 - 700	2

The cumulative frequency distribution graph (fig. 9) shows that 50 percent of the wells have yields equal to or less than 380 gpm.

Specific capacities of the wells in the stratified drift range from 4.0 to 69 and average 19 gpm per foot of drawdown.

WATER QUALITY

The quality of ground water for most uses is as important as its availability. All naturally occurring water contains mineral constituents in various proportions as a result of leaching of soluble material from the atmosphere, soil, and rocks through which the water moves. Factors that control the chemical quality of ground water are: temperature, pressure, duration of contact with various rock types, and human activities.

Chemical analyses of water samples from 54 wells in the Brunswick Formation and 5 wells in the Pleistocene deposits are listed in table 5. The median, minimum, maximum, 10-percentile, and 90-percentile concentrations are given for all chemical constituents and properties of the ground water in the Brunswick Formation in table 3. Sampling sites are shown in figure 2.

REFERENCE #3

Alcan Powders / Pigments

901 Lehigh Ave

Union, NJ 07083

Contacts: Ed Divers

Tom Yoshi

July 10, 1992

TEAM MEMBERS: JOHN HAAS
T.L.
Santosh Shanmuganathan
ISO

Met w/ Tom Weir
Marty Catapane

~10pm

Weather - Sunny 79°F

Since ~~1919~~ 1916

Metal Disintergrating until ~1960's - produce copper powder

Marten Marietta had own. for a few years

Alcan ~late ~~60's~~ 1963.

Spent Mineral Spirits
- Safety Clean
approx 2,000/qtr. (gals)

Discharge permits - copied

No daycare facilities known

OBrien & Gere studies

Phase 1 removed all UST's - mineral spirits gas

Phase 1
Monitoring wells - recovery wells.

Elizabeth Town Water - handles drinking water.

Employed - 76 (approx.)

10½ acres. - Approx Area

OBrien & Gere → Tom Pelis
315 437 6100

Doctor Peter Segredto
corporate envrin.
216 523 8252

ECRA inspections early '80's

Monitoring wells 12ft deep.

one leaking drum
from OBrien & Gere - DOOS
was contained no evidence of release
Requested Info on:
HISTORY
AIR DISCHARGE PERMITS
Wastewater Discharge
Manifests
SITE MAP

T. Weir Agreed to send

→ to concrete pad w/ curb
dike. Vent/overflow pipe
closed - through dike.
Area surrounding SWMU - paved.

Site walk: observed monitoring/
recovery wells. No evidence
of stress
Recovery well operation -
not discharging at present

Rear of area shaved
approx. 27 households
in the vicinity. Therefore,
76 persons were identified
within 200 feet of the
property.

REFERENCE #4

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
HAZARDOUS WASTE INSPECTION REPORT

EPA

DWM-009

GENERATOR INSPECTION REPORT

FACILITY INFORMATION

FACILITY NAME: Alcan Powders & Pigments

FILE NUMBER: 20-19-52

VHT FACILITY FILE NUMBER: _____

PERMIT #: _____

REGION: 4

INSPECTION DATE: 8/15/89 - 8/16/89

INCIDENT/CASE NUMBER: _____

INSPECTION TYPE: Generator - Land Ban

RESPONSIBLE AGENCY CODE: _____

INSPECTOR'S NAME: Dan Burgoyne

INSPECTOR'S AGENCY: DEP / DHWM

INSPECTOR'S BUREAU: MFO

EPA ID NUMBER: NJD065815771

ADDRESS:
901 Lehigh Ave.
Union, N.J. 07083

LOT: 4 BLOCK: 504

COUNTY: Union

FACILITY PERSONNEL: Mr Marty Catapane

TELEPHONE #: (201) 851-4558

OTHER STATE/EPA PERSONNEL: _____

REPORT PREPARED BY: Dan Burgoyne

REVIEWED BY: [signature]

DATE OF REVIEW: 9/8/89

REVISION: 3
'88

5/15 & 5/16/5-1

TIME IN: 0830 0830

TIME OUT: 1630 1030

PHOTOS TAKEN (__) YES (X) NO IF YES, HOW MANY? _____

SAMPLE TAKEN (__) YES (X) NO NO. OF SAMPLES _____

NJDEP SAMPLE ID#: _____

MANIFESTS REVIEWED (X) YES (__) NO

Number of manifests in compliance 34

Number of manifests not in compliance 0

List manifest document numbers of those manifests not in compliance.

-A1-

SUMMARY OF FINDINGS

FACILITY DESCRIPTION AND OPERATIONS:

On 8/15 and 8/16/89 I conducted an inspection at Alcan Powders and Pigments located at 901 Lehigh Avenue, Union, N.J. The purpose of the inspection was to determine compliance with hazardous waste generator regulations as established under N.J.A.C. - 7:26-1 et seq. The inspection also involved determination of compliance with U.S.E.P.A. land ban restrictions.

At the facility I met with Mr Marty Catapane the Shipping/Traffic Supervisor who has also inherited environmental affairs responsibility. I explained to Mr Catapane the purpose of the visit and what the inspection would entail. Mr Catapane explained that Alcan Powders and Pigments is a Division of Alcan Aluminum Corporation, and has been at this location for approximately 60 years. The facility employs approx. 76 people and the plant operates 3 shifts - 7 days a week.

At present the facility manufactures copper, bronze and tin powders and produces a few specialty products antimony, magnesium and silicon, and nickel and silver all flake particle/powders. The facility previously use to manufacture aluminum paste and an aluminum powder product, but this production has been moved to Alcan's Illinois facility. The facility is currently going through an ECRA site clean-up, this has been going on for approximately 1 year.

SUMMARY OF FINDINGS

FACILITY DESCRIPTION AND OPERATIONS (continued):

Ground water monitoring wells have been installed and O'Brien & Gear (an environmental consultant) has been contracted with for these purposes. Underground storage tanks have been removed and areas cleaned, equipment dismantled, cleaned and removed for work areas which were associated with aluminum paste and powder production. The ground water was determined to be contaminated with mineral spirits and the clean-up is being monitored by FCRA. According to Mr Catapane the mineral spirits contamination was most likely due to leaking underground storage tanks which were removed as a result of the elimination of the aluminum production.

Mr Catapane gave me an overview and complete inspection of the processes. The first area inspected was the Copper powder manufacturing process which takes place in Building #3. Here scrap copper bundled together in blocks is melted down in a furnace run at 3100°F, the molten copper is poured into a high pressure water stream (2,000 psi) and flame, as a result the copper becomes atomized or sprayed into fine particles, this mixture then goes through a filter to reduce water. The copper is now in powder form. This activity takes place on the 2ND Floor of BLD #3. Also on the 2ND floor the wet copper powder goes through a drier, then into a filter cloth which is rotated and shot with air in order to remove excess

SUMMARY OF FINDINGS

FACILITY DESCRIPTION AND OPERATIONS (continued):

liquid, the powder then goes into a settling tank, from there the powder is run on to a furnace conveyor belt where it goes through the furnace for additional drying at 700°F. At the end of the belt the Copper cake is transfe into the basement for crushing. After crushing the powder is screened on portable screens located on the 1ST floor. After screening the powder is collected into hoppers. From the hoppers the powder is conveyorized to a blender located on the 1ST floor. From the blender the rotated powder is poured into finished drums. According to Mr Catapane the facility processes approximately 750,000 - 1,000,000 lbs of Cu./month. There is a baghouse which collects particulate from the process to eliminate copper particulate from being dispersed throughout the building. Prior to conducted the inspection I reviewed DEQ- air pollution information and found that the facility is routinely inspected by A.P.C. as part of their air pollution data system inspection schedule. The A.P. ID # 40055 has been assigned this facility and there are 43 sources of emission on record either permitted or grandfathered.

The next process area inspected was the tin manufacturing plant located in Building #7. Here tin ingots are melted down in a furnace at 800°F and poured into a high pressure air stream at 200 psi, the tin particle is blown by air stream

and sucked into a vacuum system, collected via the baghouse collection system, the tin fines are shaken from the bags within the baghouse and collected in a drum. The plant processes between 100,000-150,000 lbs/month.

Bronze manufacturing takes place in Building #17 cut pieces of copper wire are melted in a small electric furnace to 2,000°F, at this point tin is melted from an ingot and added to the copper forming bronze the particles are shot into a high pressure air stream between 215-220 psi and shot to a vacuum chamber which feeds a baghouse. The bags are shaken and the bronze particle is collected in a drum. Drums are put over a screening device, the screened particles are put into a blender and then drummed for final product. Larger particles go back into the system. The drummed final products from each process are stored in the facility warehouse (Bld #2). At this time no activity was taking place.

The next work area inspected was the Specialty Product area found in Building #11. The first process observed was the Antimony powder production equipment. Mr Catapone informed me that an antimony is first crushed to 2" rocks and carried by a small conveyor to a Hammermill. The Hammermill breaks the rocks to finer particles, and then sends the fines to a hopper apparatus. From the hopper the fines are sent through a pulverizer which is a smaller version of the hammermill. The pulverized fines are

are then screened and the finer particles are then drummed and shipped to the warehouse for sale.

The Silver and Nickel specialty product are pumped into a hammermill with mineral spirits as a slurry. The slurry is pumped into a filter press, the mineral spirits are collected in a vat to be reused. After 24 hours in the filter press the material is 95% dry powder. The powder is then sent through a vacuum drier. The powder is then put on to metal trays and placed into a steam jacketed unit, here excess mineral spirits are driven off, the mineral spirit gases are sent through a condensor and the liquid is paired and reused. The powder is screened over a sieve and collected in a drum and sent to the warehouse for shipping. According to Mr Catapano small quantities of mineral spirits are used approximately 100 - 200 gals / week.

The metal powders produced at this facility are used in industry (auto) for the manufacture of gas filters, engine bearings, small gears and sprockets, and brushes for electric motors. Slag metal skimmings and contaminated copper are sold to scrap dealers and either reclaimed or recycled. The dealers are Thielheimer Bros of Philadelphia and Goldberg and Son of Pa. Mineral Spirit waste is shipped as a hazardous waste classified as D001.

Building #1 has a machine shop, some oil is

used and some waste is generated and classified as (XTDD). The shop has a drill press, 2 lathes, a band saw, a milling machine, and a pipe threading machine.

Building #6 is now out of service as of 7/87 which was where aluminum paste and powder production also took place, there was also a testing laboratory housed here when the plant was active. The various laboratory chemicals were either shipped to the Illinois facility or disgarded as hazardous waste. Various hazardous waste types were shipped off site as lab packs to Advanced Environmental Technology Corporation. AETC also handles the facilities DOOI (mineral spirit) and XTDD (waste oil) waste generated. Mr Catapane stated that there are 8 underground storage tanks on the west side of BLD #6 under the driveway which will be removed. At present the tanks are empty.

On the south side of the facility is a small tank farm within a concrete containment wall. These tanks are presently out of service and use to contain mineral spirits when the Aluminum Reduction plant was running. The tank farm consists of 3- 10-12,000 gal. storage tanks and one - 5,000 gal. storage tank according to Mr Catapane. Mr Catapane went on to say that large quantities of mineral spirits were used for the manufacture of aluminum paste.

Near BLD #6 is the Boiler ROOM which

Contains 3 natural gas boilers.

The hazardous waste storage area is located outside just south of the warehouse BLD #2, at this time 35-55 gal drums of hazardous waste was stored, all D001 waste type. The drums were all in good condition, properly labeled, sufficient aisle space, closed, and not in danger of leaking. The waste was not stored in excess of 90 days according to the listed accumulation start dates.

After completing the site inspection returned to Mr Catapane's office, he introduced me to Tom Weir - Alcan's Project Engineer. I asked Mr Weir as to the wastewater system at the facility and the on-going ECRA project taking place at this time. Mr Weir stated that the facility has a combined sewer system presently discharging to Joint meeting of Union/Essex. Joint meeting checks the wastewater effluent for metals. A project is underway which will be monitored by Joint meeting to separate the sewer system into a single sanitary line and single storm sewer line. Recon Systems Inc has been contracted with to do this project for Alcan.

Mr Weir stated that as to the ECRA project, underground storage tanks will have to be removed, O'Brian and Gere the env. consultants are taking ground water samples, soil samples, and

monitoring the ground water wells.

After going through the interview with Mr Weir, I reviewed the facilities manifests for 1987, 1988, and 1989, 34 manifests were reviewed for these 3 years. The manifest were all complete and signed, some of the manifests however which were utilized for land ban restricted wastes failed to have the proper required land ban restriction notices as by USEPA. I requested to see laboratory analyses information, Mr Catapane stated he recently picked up the environmental responsibilities from a person who recently left and was not sure where the analysis data could be found. He stated that the lab pack wastes were known commodities and were known to be a hazardous waste if disgarded. There was MSDS information regarding the laboratory chemicals used at the facility, but info. concerning the Doul mineral spirit waste stream was unavailable.

On 8/16/89 I returned to the facility and met with Mr Catapane once again to complete the enforcement checklists. The following NJDEP violations were observed and written:

7:26-5.5(d) Facility failed to maintain waste analysis info. for hazardous waste manifested offsite for 3 years.

7:26-7.4(f) Same violation as written above (should be recinded since violation is identical to 7:26-8.5(d))

7:26-9.6(f)5 Facility failed to arrange biannual inspections with the local fire dept.

7:26-9.4(g)8 Facility failed to conduct semi-annual d
7:26-9.4(g)6i " " " provide written job title
and name of employee filling each hazardous waste mgmt.
position.
7:26-9.4(g)6ii Facility failed to have a written job
description for each position related to hazardous waste
management.

The USEPA should be notified that the genera
did not have land ban restriction notices on some
of the lab pack waste manifests as required
under 268.7(a)(1).

The inspection was completed, Mr Catapano
recieved an NOV for the NJDEP regulations cited.

-B-

Describe the activities that result in the generation of hazardous waste.

Various lab pack materials were removed in 1987 and 1988 as part of closure of a laboratory (BLD #6) on site.

Waste continued to be generated on site is mineral spirits (D001) from specialty product production

Machine shop oil (X726)

Identify the hazardous waste located on site, and estimate the approximate quantities of each. (Identify Waste Codes)

25 - 55 gal drums of mineral spirit waste (D001)

GENERAL CHECKLIST

GENERAL		YES	NO	N.A
7:26-7.4(a)1	Does the Generator have an EPA ID number?	✓		
HAZARDOUS WASTE DETERMINATION				
7:26-8.5(a)	Did the generator test its waste to determine whether it is hazardous?	✓		
7:26-8.5(b)	Did the generator determine the hazardous characteristics based upon knowledge of process?	✓		
	Is the waste hazardous?	✓		
7:26-8.5(d)	Were test results, waste analysis, or other determinations made in accordance with this section kept for three years from the date that the waste was last sent to an on-site or off-site TSF?		✓	
MANIFESTS				
7:26-7.4 a)4	Does each manifest have the following information? Please circle the elements missing and obtain a copy of the incomplete manifests. (List those manifests that are deficient on C-1).			
7:26-7.4(a)4i	The generator's name, address and phone number.	✓		
7:26-7.4(a)4ii	The generator's EPA ID number.	✓		
7:26-7.4(a)4iii	The hauler(s) name, address phone number and NJ registration.	✓		
7:26-7.4(a)4iv	The haular(s) EPA ID number.	✓		
7:26-7.4(a)4v	The name, address and phone number of the designated TSD facility.	✓		
7:26-7.4(a)4.i	The TSF's EPA ID number.	✓		
7:26-7.4(a)4v	The name, address and phone number of the designated TSD facility.	✓		
7:26-7.4(a)4vii	The name, type and quantity of hazardous waste being shipped, including such particulars as may be required regarding same?	✓		
7:26-7.4(a)4viii	Special handling instructions and any other information required on the form to be shipped by generator?	✓		

		YES	NO	N/A
7:26-7.4(3)	Did the generator describe all N.O.S. wastes in Section J?	✓	—	—
7:26-7.4(a)ix	When shipping hazardous waste to a waste reuse facility does the generator enter the waste reuse facility I.D. # in the section G of the Uniform Manifest?	—	—	✓
7:26-7.4(a)5	Before allowing the manifested waste to leave the generator's property, did the generator:	—	—	—
7:26-7.4(a)5i	Sign the manifest certification by hand?	✓	—	—
7:26-7.4(a)5ii	Obtain the handwritten signature of the initial transporter and date of acceptance on the manifest?	✓	—	—
7:26-7.4(a)5iii	Retain one copy and forward one copy to the state of origin and one copy to the state of destination?	✓	—	—
7:26-7.4(a)5iv	Provide the required numbers of copies for: generator, each hauler, owner/operator of the designated facility, as well as one copy returned to the generator by the facility owner/operator?	✓	—	—
7:26-7.4(a)5v	Give the remaining copies of the manifest form to the hauler?	✓	—	—
7.26-7.4(f)	Has the generator maintained facility records for three (3) years? (Manifest(s), exception report(s) and waste analysis)	—	✓	—
7:26-7.4(h)1	Has the generator received signed copies of portion 8 (from the TSD facility) of all manifests for waste shipped off site more than 35 days ago?	✓	—	—
7:26-7.4(h)1	If not: Did the generator contact the hauler and/or the owner or operator of the TSDF and the NJDEP at (609) 292-8341 to inform the NJDEP of the situation?	—	—	✓
7:26-7.4(h)2	Have exception reports been submitted to the Department covering any of these shipments made more than 45 days ago?	—	—	✓

7:26-9.3 Accumulation Time

How is waste accumulated on site?

(✓) Containers
(__) Tanks (greater than 90 days)
(complete HWMF (TSD) Facility Checklist)
(__) Tanks (less than 90 days)
(__) Above ground
(__) Below ground
(__) Surface Impoundments
(complete HWMF (TSD) Facility Checklist)
(__) Piles (complete HWMF checklist)

		YES	NO	N/A
7:26-9.3(a)1	Is waste accumulated for more than 90 days?	__	✓	__

STOP HERE IF THE HAZARDOUS WASTE MANAGEMENT FACILITY (TSF) CHECKLIST IS FILLED OUT.

Short term accumulation standards for generators who accumulate waste in containers and tanks for 90 days or less:

		YES	NO	N/A	
Containers					
7:26-9.4	What type of containers are used for storage. Describe size, type, quantity, and nature of waste (e.g. 12 fifty-five gallon drums of waste acetone). 25- 55 gallon drums of D001 ignitable haz. waste (ign. based on mineral spirits)	—	—	—	
7:26-9.4(d)1	Do the containers appear to be in good condition, not in danger of leaking?	✓	—	—	
	If no, describe the problem (include number of containers involved.)				
7:26-9.4(d)4i	Are all containers securely closed except those in use?	✓	—	—	
7:26-9.4(d)4iii	Do the containers appear to be properly handled or stored in a manner which will minimize the risk of the container rupturing and/or leaking?	✓	—	—	
7:26-9.4(d)4iv	Are containerized hazardous wastes segregated in storage by waste type?	—	—	✓	(all D001)
7:26-9.4(d)4v	Is every container arranged so that its identification label is visible?	✓	—	—	
7:26-9.4(d)5	Is the container storage area inspected at least daily?	✓	—	—	
7:26-9.4(d)6	Are containers holding ignitable and reactive wastes located at least 50 (fifty) feet (15 meters) from the facilities property line?	✓	—	—	
7:26-7.2(a)	Did the owner/operator conspicuously label appropriate manifest number on all hazardous waste containers that are intended for shipment?	—	—	✓	
7:26-9.3(a)3	Is each container clearly dated with each period of accumulation so as to be visible for inspection?	✓	—	—	

		YES	NO	N/A
7:26-7.2(b)	Did the owner/operator insure that all containers used to transport hazardous waste off site are in conformance with applicable DOT regulations? (49CFR 171, 179)	✓		
Tanks (Less than 90 day storage)				
7:26-9.3(b)	Does the generator accumulate hazardous waste on-site in an above ground tank? If yes, describe the tank(s): 1) Capacity _____ 2) Shell thickness _____ 3) Material Construction _____ 4) Age of tank _____			
7:26-9.3(b)	Does the generator have written approval from the Department to store hazardous waste(s) in this tank(s) for ninety days or less?			
7:26-9.3(b)1	Does each tank(s) have sufficient shell thickness to ensure the tank will not collapse or rupture as specified by the Department?			
7:26-9.3(b)4	Is the tank(s) designed so that at least 99% of the volume of each of the tanks can be emptied by direct pumping or drainage?			
7:26-9.3(b)5	Is each tank(s) rendered empty (1% or less remaining) every 90 days or less?			
7:26-9.3(b)6	Are all wastes removed from the tank(s) shipped off-site to an authorized facility or placed in an on-site, authorized facility?			
7:26-9.3(b)8	If part of the tank is below grade, is it constructed to allow visual inspection of the tank, comparable to a totally above-ground tank and is is secondary containment provided for the below grade part?			
7:26-10.5(c)1	Are materials which are incompatible with the material of construction of the tank(s) placed in the tank(s)?			
7:26-10.5(c)2	Does the generator use appropriate controls and practices to prevent overfilling?			

		YES	NO	N/A
7:26-10.5(d)2i	For uncovered tanks, is there sufficient (two feet or acceptable documentation) freeboard to prevent overtopping by wave or wind action by or precipitation?			
7:26-9.3(c)3	Does each tank(s) or storage tank area have secondary containment?			
7:26-10.5(d)1	Is the containment system capable of collecting and holding spills, leaks, and precipitation?			
7:26-10.5(d)1i	Is the base underlying the tank(s) free from cracks, gaps, and sufficiently impervious to contain leaks, spills, and accumulated rainfall until the collected material is detected and removed?			
7.26-10.5(d)1ii	Does the containment system consist of material compatible with the wastes being stored?			
7:26-10.5(d)1iii	Is the containment system sloped or otherwise designed to efficiently drain and remove liquids resulting from leaks, spills and precipitation?			
7:26-10.5(d)1iii	Is the tank protected from contact with accumulated liquids?			
7:26-10.5(d)1v	Does the containment system have sufficient capacity to contain ten percent of the volume of all tanks or the volume of the largest tanks whichever is greater?			
7:26-10.5(d)2	Is run-on into the containment area prevented?			
	If not, explain.			
7:26-10.5(d)3	Is precipitation removed from the pump or collection area in a timely manner to prevent blockage or overflow of the collection system?			
7:26-10.5(d)4	Is spilled or leaked waste removed from the pump or collection area daily?			

		YES	NO	N/A
7:26-10.5(d)4i	If the collected material is hazardous waste under NJAC 7:26-8, it is managed as a hazardous waste in accordance with all applicable requirements of this chapter?	—	—	✓
7:26-9.4(g)4	<u>Personnel Training</u> Have facility personnel successfully completed a program of classroom instruction or on-the-job training since six months after the date of their employment or assignment to the facility or to a new position at the facility?	✓	—	—
7:26-9.4(g)5	Has facility personnel taken part in an annual review of initial training?	✓	—	—
7:26-9.4(g)2	Is the program directed by a person trained in hazardous waste management procedures and does it include instruction which teaches facility personnel hazardous waste management procedures (including contingency plan to implementation) relevant to the positions in which they are employed?	✓	—	—
	Is there written documentation of the following:			
7:26-9.4(g)6i	Job title for each position at the facility related to hazardous waste management, and the name of the employee filling each job?	—	✓	—
7:26-9.4(g)6ii	A written job description for each position related to hazardous waste management?	—	✓	—
7:26-9.4(g)6iii	A written job description on the type and amount of both introductory and continuing training that has been and will be given to personnel in jobs related to hazardous waste management?	✓	—	—
7:26-9.4(g)6iv	Documentation of actual training or experience received by personnel?	✓	—	—
7:26-9.4(g)7	Are training records kept on all current employees until closure of the facility and training records kept on former employees for three years from their last date of employment?	✓	—	—

		YES	NO	N/A
7:26-9.6	Preparedness and prevention			
	Does the facility comply with preparedness and prevention requirements including maintaining:			
7:26-9.6(b)1	An internal communications or alarm system?	✓		
7:26-9.6(b)2	A telephone or other device to summon emergency assistance from local authorities?	✓		
7:26-9.6(b)3	Portable fire equipment, spill control equipment, and decontamination equipment?	✓		
7:26-9.6(b)4	Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray system?	✓		
7:26-9.6(c)	Is equipment tested and maintained?	✓		
7:26-9.6(d)1	Is there immediate access to communications or alarm systems during systems during handling of hazardous waste?	✓		
7:26-9.6(e)	Adequate aisle space (18") to allow unobstructed movement of personnel fire protection equipment, spill control equipment and decontamination equipment?	✓		
	If no, please explain.			
	In your opinion, do the types of waste on site require all of the above procedures, or are some not required?	✓		
	Explain.			
7:26-9.6(f)	Has the facility made the following arrangements, as appropriate for the type waste handled on site:			
7:26-9.6(f)1	Familiarize police, fire departments and emergency response teams with the layout of the facility and hazardous waste handled - associated hazardous places where facility personnel would normally be working, entrances and roads inside facility and possible evacuation routes.	✓		

7:26-9.6(f)1	Where more than one police and fire department might respond to an emergency, is there an agreement designating primary emergency authority to a specific police or fire department, and agreements with any others to provide support to the primary emergency authority? City of Union has Emergency response Coordinator	✓	—	—
7:26-9.6(f)3	Agreements with emergency response contractors, and equipment suppliers?	✓	—	—
7:26-9.6(f)4	Arrangements to familiarize local hospitals with the properties of hazardous waste handled at the facility and the types of injuries or illnesses which could result from fires, explosions or discharges at the facility?	✓	—	—
7:26-9.6(f)5	Arrangement with local fire departments to inspect the facility on a regular basis with at least two (2) inspections annually?	—	✓	—
7:26-9.6(f)6	If authorities identified in (f)1 through 5, above decline to enter into such arrangements, has the owner or operator documented this refusal in the operating record.	—	—	✓
7:26-9.4(g)8	Are semi-annual drills conducted involving all employees and appropriate local authorities to test emergency response capabilities at the facility in accordance with the contingency plan and emergency procedures development pursuant to NJAC 7.26-9.7?	—	✓	—
7:26-9.4(g)8i	If no, did the owner or operator petition the Department for an exemption from the semi annual drills requirement?	—	✓	—
7:26-9.4(g)8ii	Did the owner or operator petition the Department for an exemption excluding some or all local officials in the semi annual drill requirements?	—	✓	—
	If yes, did the owner operator provide those specific local officials with written approval of the exemption?	—	—	✓

	Contingency Plan and Emergency Procedures			
7:26-9.7(a)	Does the facility have a written contingency plan for emergency procedures designed to deal with fires, explosions, hazards to human health or environment, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents into air, soil or surface water?	✓		
7:26-9.7(b)	Are provisions of the plan carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment?			✓
7:26-9.7(c)	Does the contingency plan describes the actions facility personnel shall take in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at the facility?	✓		
7:26-9.7(d)	Did the owner or operator prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan in accordance with 40 CFR 112 or 300 or a Discharge Prevention Containment and Countermeasure (DPCC) Plan in accordance with N.J.A.C. 7:1E-4.1 et seq.			✓
	If yes, did the owner or operator amend that plan to incorporate hazardous waste management provisions that are sufficient to comply with the requirements of this section?			✓
7:26-9.7(e)	Does the plan describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services?	✓		

7:26-9.7(f)	Does the plan list names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator and is this list kept up to date? Where more than one person is listed, one shall be names as primary emergency coordinator and others shall be listed in the order in which they will assume responsibility as alternates?	✓
7:26-9.7(g)	Does the plan include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external) and decontamination equipment), where this equipment is required? Is the list up-to-date? In addition, does the plan include the location and physical description of each item on the list, and a brief outline of its capabilities?	✓
7:26-9.7(h)	Does the plan include an evacuation procedure for facility personnel where there is a possibility that evacuation could be necessary? Does this plan describe signal(s) to be used to begin evacuation, evacuation routes, and alternative evacuation routes (in case where the primary routed could be blocked by releases of hazardous waste or fires)?	✓
7:26-9.7(i)	Is a copy of the contingency plan and all revisions to the plan: 1. Maintained at the facility; 2. Has the contingency plan been submitted to local authorities (police fire departments, emergency response teams)?	✓ ✓
7:26-9.7(k)	Is there an employee on site or on call at all times with the responsibility of coordinating, all emergency response measures?	✓

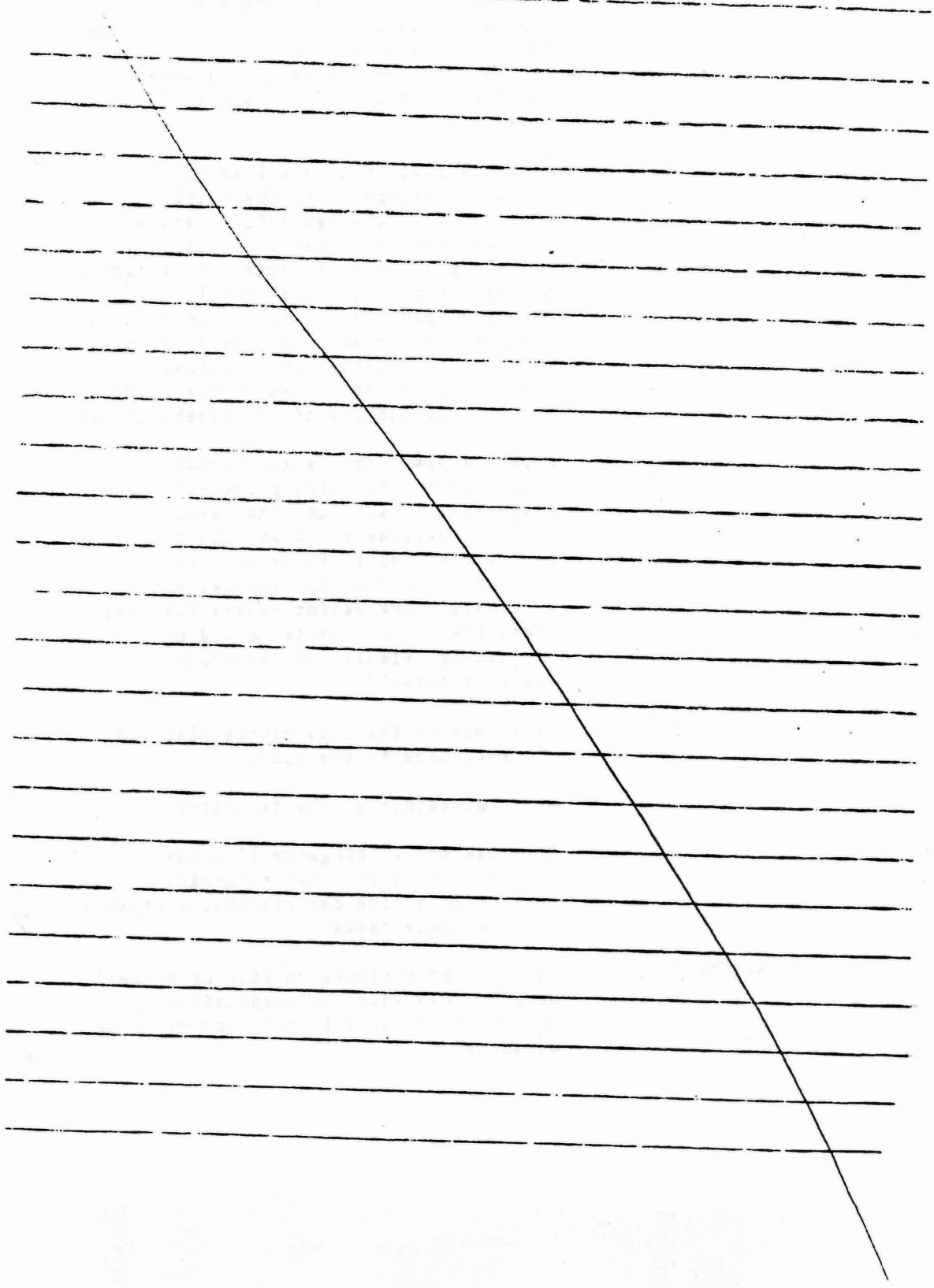
Confidential Memorandum

TO:

FROM:

DATE:

SUBJECT:



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
ENFORCEMENT ELEMENT

CHECKLIST FOR REVIEW OF WASTE ANALYSIS PLANS FOR COMPLIANCE WITH LAND DISPOSAL RESTRICTIONS

		YES	NO
I.	Is a Waste Analysis Plan available for review?	___	✓
	If yes and facility is generator with interim status or permit, continue with PART I. A, B and C.		
	If yes and facility is Commercial TSD, GO TO PART II.		
	If yes and facility is generator treating and disposing of their own waste, GO TO PART II and IV.		
	If no and facility is Commercial Transfer Station, GO TO PART III.		
	If no and facility is in generator only status, fill out PART I. A and B only.		
A.	Has facility determined whether waste is restricted from land disposal based solely on knowledge of waste?	___	✓
	If no, GO TO PART IB.		
	If yes,		
1.	Are any chemicals used in facility's process(es) likely to produce a restricted waste stream(s)?	___	___
	If yes, explain below.		
2.	Are the chemicals used as raw materials?	___	___
	If yes, list which ones below.		
3.	Are solvents used ?	___	___
	If yes, list which ones below.		
4.	Has waste stream changed since the facility made its last determination about land restrictions ?	___	___
	If yes, explain below.		

		YES	NO
5.	If generator claims solvent concentration is below action level, are analytical results available?	___	___
B.	Has facility determined whether waste is restricted from land disposal by testing the waste or waste extract? According to facility, TSD has conducted waste analysis, however not available at facility	✓	___
	If no, facility is not in compliance.		
	If yes,		
1.	Was the TCLP used?	___	___
2.	Was the Paint Filter Liquids Test (PFLT) used ? not sure see above	___	___
	If no to 1 & 2 facility is not in compliance.		
3.	Has waste stream changed since last analysis ?	___	✓
	If yes, explain below.		
C.	Does WAP specify how facility will comply with LDR?	___	___
	For all restricted wastes ?	___	___
	If no, facility is not in compliance.		
II.	Review of Commercial TSD WAP.		
A.	Does WAP require the facility to analyze the first shipment of each waste type from each client ?	___	___
B.	Does WAP provide means of classifying potentially restricted wastes as:		
	1. From off-site source?	___	___
	2. Facility's own waste?	___	___
	3. Waste to be shipped off-site?	___	___
C.	Does WAP state what procedures will be used for periodic waste inspections after first shipment ?	___	___
D.	Are appropriate test methods specified in WAP ?	___	___
E.	Does WAP specify procedures for handling each type of restricted waste listed in manifests received ?	___	___

		YES	NO
F.	Is latest revision of WAP dated after 8 Jul 1987 ?	___	___
G.	Does WAP specify that residue of restricted waste will be analyzed ?	___	___
H.	If off-site treatment facility, does WAP specify that analytical data will be obtained from generator or previous handler of waste ?	___	___
I.	Additionally, if TREATMENT facility,		
	1. Does WAP specify the analysis to be performed on treatment residues ?	___	___
	2. Does WAP address ALL residues (including those from non-hazardous wastes and non-restricted wastes) as potentially restricted wastes ?	___	___
	3. Does WAP specify that residues will be evaluated from point of generation ?	___	___
	4. If facility is INCINERATOR, does WAP specify that restricted DIOXIN wastes F020-F023 and F026-F028 will NOT be accepted ?	___	___
J.	Additionally, if Off-site Land Disposal Facility,		
	1. Does WAP state procedures for testing incoming waste shipments allowing facility to be certain that BDAT standards are met ?	___	___
	If no, does plan state that customers must supply test results ?	___	___
	2. Does WAP state that all waste analysis results and certifications will be maintained ?	___	___
	3. Do operating records show instances of facility rejecting shipments ?	___	___
III.	Facility is a Commercial Transfer Station		
	Does facility store restricted waste for less than ten days ?	___	___
	If no, requirements of PART II apply.		

	YES	NO
If yes, do operating records include		
1. Customer waste analysis results ?	____	____
2. Customer notifications ?	____	____
3. Customer certifications ?	____	____

IV. Facility is Generator treating and disposing of their own waste.

In addition to requirements of part II,

A.	Is the WAP being implemented for both restricted wastes and their treatment residues ?	____	____
B.	Does WAP specify that treatment residues will be tested for compliance with BDAT ?		
C.	Does WAP specify that non-treated restricted waste will be tested prior to land disposal for BDAT compliance ?	____	____
D.	Do operating records contain all testing records ?	____	____

Inspector: Dan Bursgrave
Address: 2 Babcock Pl.
W. Orange N.J. 07052
Telephone No: (201) 669-3960

RCRA LAND DISPOSAL RESTRICTION
GENERATOR CHECKLIST

I. HANDLER IDENTIFICATION

A. Handler Name: Alcan Pigments and Powders
B. Street (or other identifier): 901 Lehigh Ave.
C. City: Union
D. State: N.J.
E. Zip Code: 07083
F. County Name: Union
G. Nature of Business; Identification of Operations: SIC Code(s): Mfg of Metal Powder (Cu, Sn Bronze)
H. EPA ID #: NJD065815771
I. Handler Contact (Name and Phone Number): Mr Marty Catapano 201-851-4558

II. GENERATOR COMPLIANCE

Comments

A. Waste Identification

1. F-Solvents

a. Does the handler generate the following vastes?

(i) F001, ~~F002~~, F004, or F005 ✓ Yes ___ No
lab pack

(ii) F003 ___ Yes ✓ No

If an F003 vastestream (listed solely for ignitability) has been mixed with a non-restricted solid or hazardous vaste, does the resultant mixture exhibit the ignitability characteristic? ___ Yes ___ No

N/A

b. Source of the above: Form 8700-12 ___; Part A ___; Part B ___; Biennial/Annual Reports ___ other (specify) ✓ manifests

Appendix A is intended to assist the inspector and enforcement official in determining whether the facility is generating F-solvent vastes, if such vastes vere not identified by the facility previously. If you are concerned that F-solvent vastes may be misclassified or mislabeled, turn to Appendix A-1. To assist in identfying potentially

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

misclassified F-solvents, Appendix A-2 presents a list of corresponding P and U vastes. Note concerns below: _____

2. Dioxin vastes

a. Does the handler report the generation of the folloving vastes? (The folloving industries may generate listed dioxin vastes: organic chemicals, pesticide or formulator.)

(i) F020 - F023, F026 - F027 ___Yes ✓No
(ii) F028 ___Yes ✓No

[F-solvent BDAT standards are presented as Appendix B]

3. California Waste Identification

a. Does the facility handle any of the folloving vastes?

(i) D002 Lab pack chemicals ✓Yes ___No
(ii) D004 - D011 ✓Yes ___No

Lab Pack D005 - Barium D009 mercury D007 - Chromium

b. Does the generator handle any hazardous vastes characterized by high concentrations of halogenated organic constituents (HOCs), metals, or cyanides? ___Yes ___No

[California vaste standards are presented as Appendix C]

c. Is the generator handling any of the F, K, P, or U vastes subject to the "soft hammer" that may qualify as California vastes due to HOC, metals, or cyanide content? See Appendix D for a listing of California constituents likely to be found by vaste code. ✓Yes ___No

P092 phenylmercury acetate

d. Has the generator conducted the paint filter test (Method 9095) [§268.32(i)]? ✓Yes ___No*

properties of chemicals either known solids or liquids

e. Has the generator conducted any testing of these hazardous vastes to determine whether the concentrations qualify the hazardous vastes as California vastes? ___Yes ✓No

testing by TSD records not available for review

If no, has the generator retained records documenting his "applied knovledge" that the hazardous vaste is not a California vaste? ___Yes ✓No

*/ A potential violation is indicated

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

If "no" is answered to both parts of this question, a violation is indicated. [§268.7(a)]

Describe the nature of the records:
No records on site as to waste analysis

f. Source of the above: Form 8700-12 ___; Part A ___; Part B ___; Biennial/Annual Report ___; other (specify) ___.

4. First Third Waste Identification

a. Does the generator handle any of the wastes listed as First Third Wastes in §268.10? See Appendix E for listing. List First Third Wastes handled by the generator here:
NO

b. Does the generator handle any soft-hammer wastes (Appendices D-1, D-2, and F)? If so, list those wastes:
P092 phenylmercuric acetate

c. Are any of the soft-hammered wastes California wastes (see Appendix G)? ___Yes ✓No

If yes, the wastes must meet BDAT standards prior to disposal.

d. Has the Regional Administrator received demonstrations/certifications for all soft hammered wastes to be land disposed [§268.8(a)(2)]? ___Yes ___No* N/A

e. Source of the above: Form 8700-12 ___; Part A ___; Part B ___; Biennial/Annual Report ___; other (specify) ___.

B. BDAT Treatability Group - Treatment Standards Identification

1. Does the generator mix restricted wastes with different treatment standards for constituents of concern? ___Yes ✓No

2. If yes, did the generator select the most stringent treatment standard for the constituent of concern [§268.41(b)]? ___Yes ___No* N/A

*/ A potential violation is indicated

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

3. F Solvents - -

   a. Did the generator correctly determine the appropriate treatability group [§268.41] of the vaste (e.g., vastevaters containing solvents, nonvastevater (i.e., < 1% TOC), pharmaceutical vastevaters containing spent methylene chloride, all other spent solvent vastes)?
   ___Yes ___No*

   N/A

4. California Vastes

   a. Did the generator correctly determine the distinction between liquid hazardous vastes and non-liquid hazardous vastes that contain HOCs in concentrations greater than 1,000 mg/kg [§268.32(h)]?
   ___Yes ___No*

5. First Third Vastes

   a. Did the generator ascertain whether restricted vastes vere appropriately assigned vastevater or nonvastevater designations (nonvastevaters are > 1% TOC and > 1% suspended solids) [§268.7(a)]?
   ___Yes ___No*

   b. Does the facility handle K061 vastes?
   ___Yes ___No

   If yes, vere nonvastevaters appropriately classified in either the high or lov zinc subcategories (≥15% Zn) [§268.7(a)] [§268.41(a)]?
   ___Yes ___No*

   c. Does the facility handle K101 or K102 vastes?
   ___Yes ___No

   If yes, vere nonvastevaters appropriately classified in either the high or lov arsenic subcategories [§268.7(a)] [§268.41(a)]?
   ___Yes ___No*

   d. Is there any reason to believe that the generator may have diluted the vaste to change the applicable treatment standard (based on reviev of process operation, pipe routing, point of sampling)?
   ___Yes ___No

*/ A potential violation is indicated

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

C. Vaste Aralysis - -

1. Did the generator determine whether the vaste exceeds treatment standards based on §268.7(a):

a. Knovledge of vastes ✓Yes ___No

(i) List vastes for which "applied knovledge" vas used:
D001 - mineral spirits and various labs pack items disposed

b. TCLP ___Yes ___No

(i) List vastes for which "TCLP" vas used:
_____
_____

(ii) Appendix D lists vastes for which treatment standards are expressed as concentrations in vaste extract. Were any vastes handled by the generator subject to vaste extract standards not tested using the TCLP? ___Yes ___No

If yes, list: _____
_____

c. Total vaste anLysis ___Yes ___No

d. If files vere retained, describe content and basis of applied knovledge determination:
_____
_____
_____

If determined by TCLP or total constituent analysis, provide date of last test, frequency of testing, and attach test results.

Dates/frequency: _____

Note vhich vastes vere subjected to vhich tests:
_____
_____
_____

Note any problems (e.g., inadequate analysis, variation of vaste composition/generation for applied knovledge) _____

could have been by TSD however no records available as to type of analytical testi by TSD.

-/ A potential violation is indicated

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

e. Were wastes tested using TCLP or total constituent analysis when a process or wastestream changed [§264.13(a)(3)(i) or §265.13(a)(3)(i)]?
___Yes ___No*

See previous comments on Gen-5

2. Did the restricted wastes exceed applicable treatability group treatment standards upon generation [§268.7(a)(1)]?

List those that exceeded standards: _____

List those that did not exceed standards: _____

3. Did the generator dilute the waste or the treatment residual so as to substitute for adequate treatment [§268.3]
___Yes* ✓No

D. Management

1. Onsite management

a. Were restricted wastes managed onsite?
___Yes ___No

N/A

If no, go to "2".

b. For wastes that exceed treatment standards, was treatment in regulated units, storage for greater than 90 days, and/or disposal conducted?
___Yes ___No

If yes, TSDF checklist must be completed.

2. Offsite Management

a. If restricted wastes exceed treatment standards, did generator provide treatment facility notification with each shipment? [268.7(a)(1)]:

(i) EPA Hazardous Waste Number? ✓Yes ___No*

(ii) Corresponding treatment standard?
___Yes ✓No*

(iii) Manifest number? ✓Yes ___No*

(iv) Waste analysis, if available?
___Yes ✓No

Some lab pack items which are land ban restricted waste types didn't have land ban treatment notices
e.g. D002
D008
D009

*/ A potential violation is indicated

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

Identify offsite treatment facilities AETC
Advanced Environmental Technology Corporation
Flanders, N.J.

b. If restricted wastes do not exceed treatment standards, did generator provide the disposal facility with a notice and certification including:

N/A

(i) EPA hazardous waste I.D. number?
___Yes ___No*

(ii) Corresponding treatment standard?
___Yes ___No*

(iii) Manifest number ___Yes ___No*

(iii) Certification regarding waste and that it meets treatment standards? ___Yes ___No*

Identify land disposal facilities receiving the BDAT certified wastes _____

c. If the generator's waste is subject to a §268.5 case by case exemption, a §268.6 "no migration" exemption, or a nationwide variance (see Appendix E for restricted wastes subject to nationwide variances), does the generator's records indicate that he or she submits with each waste shipment [§268.7(a)(3)]:

(i) EPA Hazardous Waste Number?
___Yes ___No*

(ii) Corresponding Treatment Standards?
___Yes ___No*

(iii) All applicable prohibitions?
___Yes ___No*

(iv) The manifest number? ___Yes ___No*

(v) The date the wastes are subject to prohibitions? ___Yes ___No*

(vi) Does generator keep records of all notifications/certifications send to offsite facilities? ___Yes ___No*

*/ A potential violation is indicated

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

List all prohibited wastes for which records are not provided per above [§268.7(a)(b):

N/A

_____

_____

Identify TSDFs receiving any prohibited wastes subject to any exemptions and variances:

_____

_____

d. If handler generates a "soft hammer" waste, does the generator send with each "soft hammer" waste shipment to a TSDF and retain copies of, a notice that includes [268.7(a)(4)]:

The EPA Hazardous Waste Number? ✓Yes ___No*

Applicable prohibitions? ___Yes ✓No*

The manifest number? ✓Yes ___No*

Waste analysis data, where available? ___Yes ✓No

(i) Do the generator's records indicate that any soft-hammer wastes are destined for disposed in a landfill or surface impoundment [§268.33(f)]? ___Yes ✓No

If yes, list facility of destination and waste of concern [§268.8(a)(2)]

_____

_____

(ii) Has the generator submitted demonstrations and certifications for each "soft-hammered" waste destined to be disposed in landfill or surface impoundment to the Regional Administrator prior to the shipment of waste to the TSDF [§268.7(a)(2)]? ___Yes ___No*

(iii) Has the generator retained a copy of the demonstration on site [§268.8(a)(3)-(a)(4)]? ___Yes ___No*

N/A

(iv) Has the generator retained copies of all §268.8 certifications sent to the TSDF [§268.7(a)(6)] ___Yes ___No*

* A potential violation is indicated

Handler Name: _____
ID Number: _____
Inspector: _____
Date: _____

Comments

(v) Did the generator submit the demonstration to the receiving facility upon the intial shipment of the waste [§268.8(a)(3)-(a)(4)]? ___Yes ___No* N/A

(vi) If the Regional Administrator has invalidated the certification, has the generator ceased shipment of the waste and do records indicate that the generator has informed all receiving facilities of the invalidation [§268.8(b)(3)]? ___Yes ___No*

E. Storage of Prohibited Waste

1. Were prohibited wastes stored for greater than 90 days? ___Yes X No

If yes, was facility operating as a TSD under interim status or final permit [§262.34(b)]? ___Yes ___No* N/A

If yes, TSDF Checklist must be completed.

F. Treatment Using RCRA 264/265 Exempt Units or Processes (i.e., boilers, furnaces, distillation units, wastewater treatment tanks, etc.)

1. Were treatment residuals generated from RCRA 264/265 exempt units or processes? ___Yes X No

If yes, list type of treatment unit and processes

_____

_____

_____

If yes, TSDF checklist must be completed.

*/ A potential violation is indicated

Form HWM-004
3/87

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
5th Fl., 401 E. State St., Trenton, N.J. 08625

NOTICE OF VIOLATION

ID NO. NJD065815771 DATE 8/16/89

NAME OF FACILITY Alcan Powders & Pigments

LOCATION OF FACILITY 901 Lehigh Avenue, Union, N.J. 07083

NAME OF OPERATOR Mr Marty Catapane

You are hereby NOTIFIED that during my inspection of your facility on the above date, the following violation(s) of the Solid Waste Management Act, (N.J.S.A. 13:1E-1 et seq.) and Regulations (N.J.A.C. 7:26-1 et seq.) promulgated thereunder and/or the Spill Compensation and Control Act, (N.J.S.A. 58:10-23.11 et seq.) and Regulations (N.J.A.C. 7:1E-1 et seq.) promulgated thereunder were observed. These violation(s) have been recorded as part of the permanent enforcement history of your facility.

DESCRIPTION OF VIOLATION 7:26-8.5(d) Facility failed to maintain waste analysis information for hazardous wastes manifested offsite for 3 yrs. ~~7:26-7.4(f) Facility failed to maintain waste analysis records for 3 years.~~ 7:26-9.6(f)5 Facility failed to arrange with local fire dept. biannual inspections. 7:26-9.4(g)8 Facility failed to conduct semi-annual drills. 7:26-9.4(g)6i Facility failed to provide written job title and name of employee filling each hazardous waste mgmt position. 7:26-9.4(g)6ii Facility failed to have a written job description for each position related to hazardous waste mgmt.

Remedial action to correct these violations must be initiated immediately and be completed by August 31, 1989. Within fifteen (15) days of receipt of this Notice of Violation, you shall submit in writing, to the investigator issuing this notice at the above address, the corrective measures you have taken to attain compliance. The issuance of this document serves as notice to you that a violation has occurred and does not preclude the State of New Jersey, or any of its agencies from initiating further administrative or legal action, or from assessing penalties, with respect to this or other violations. Violations of these regulations are punishable by penalties of $25,000 per violation.

Daniel F. Burgoyne
Investigator, Division of Waste Management
Department of Environmental Protection

REFERENCE #5

Appendix

Appendices A and B

Site Remediation
Alcan Powders and Pigments
Union, New Jersey Facility

Alcan Aluminum Corporation
Cleveland, Ohio

April 1991

O'BRIEN & GERE

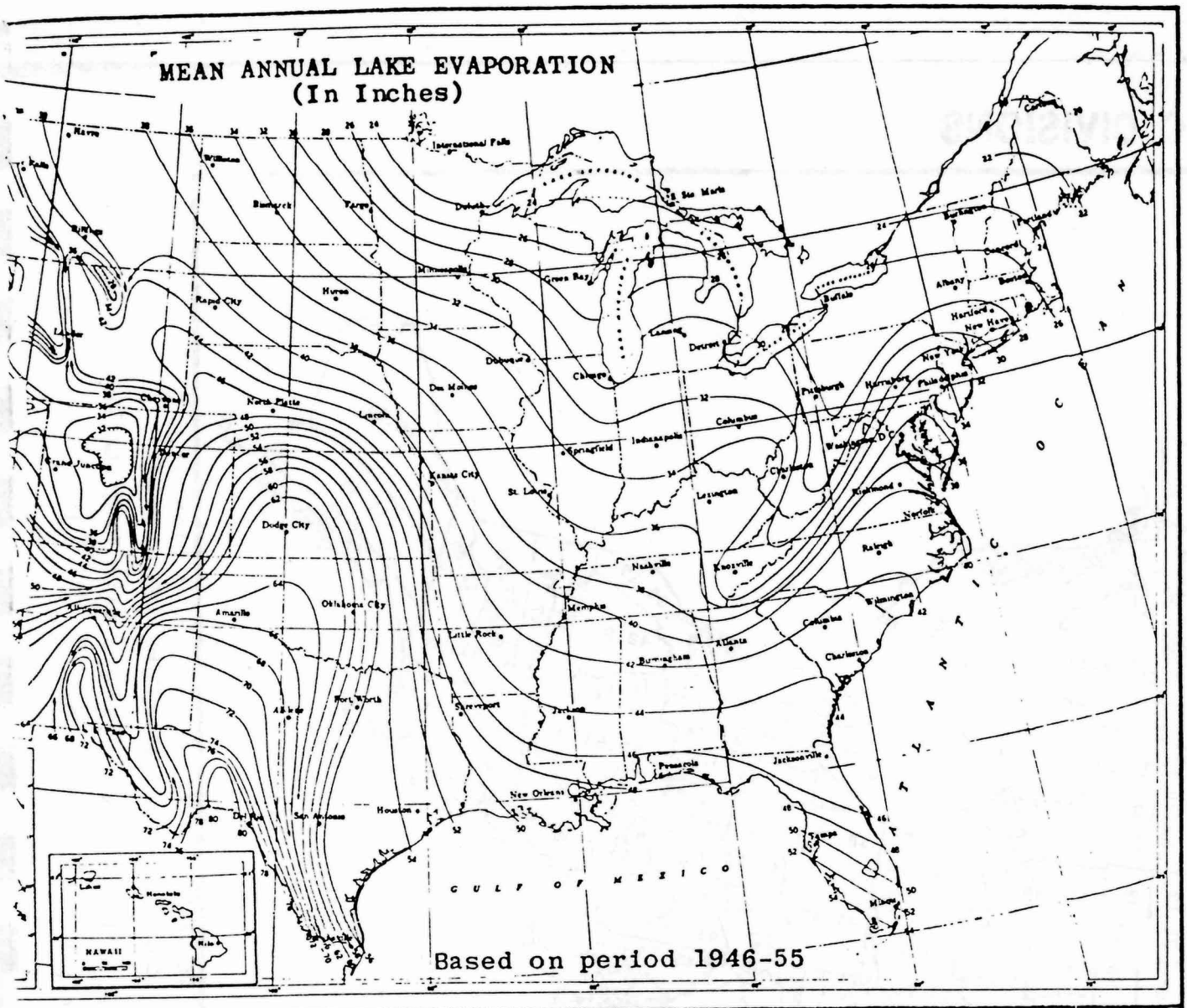
The ground water elevation map shown in Figures 3 and 4 show that the direction of ground water flow is in an east to northeast direction. The slope of the water table averages 0.02 ft/ft.

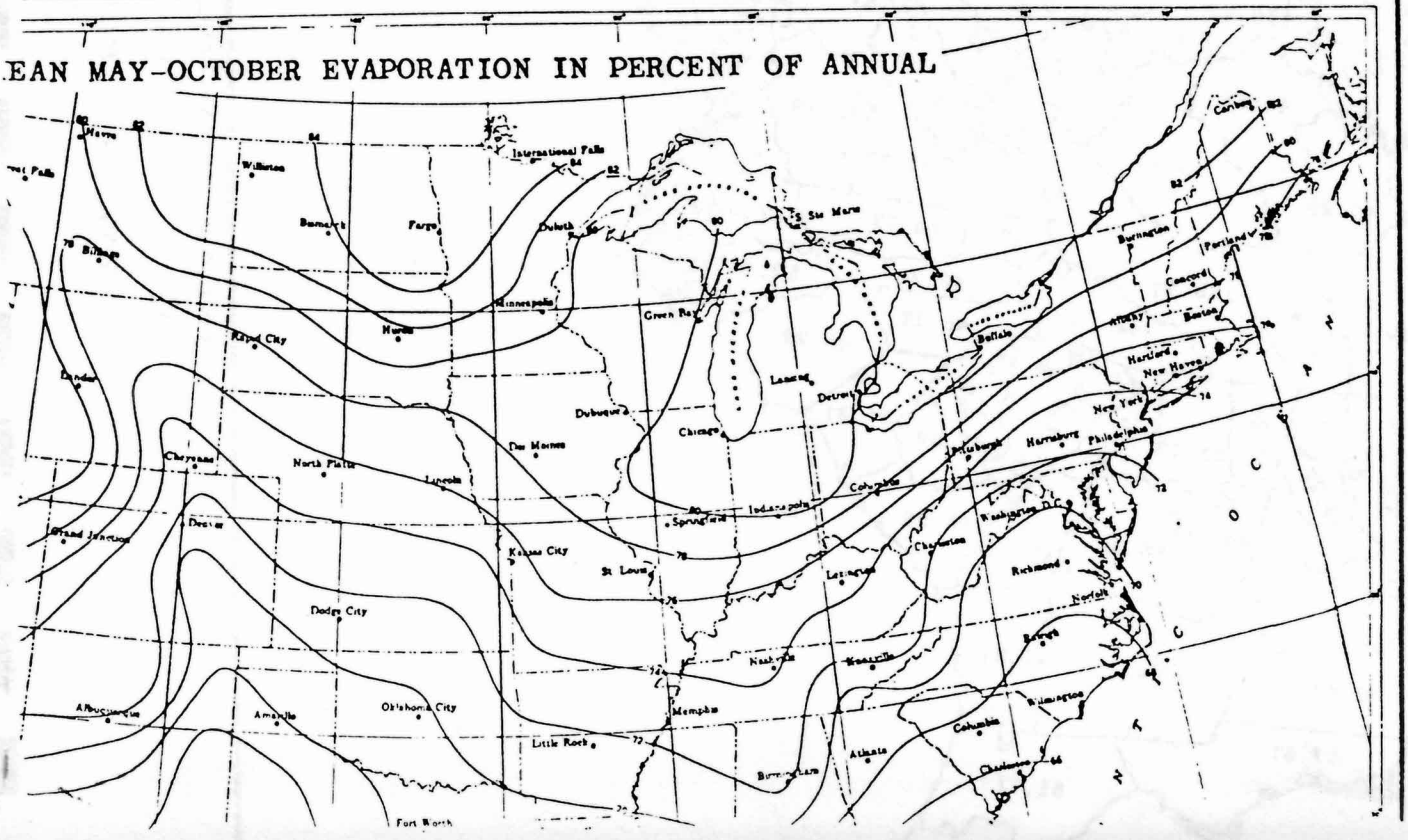
The Alcan facility is within the Elizabeth River Drainage Basin. The topographic relief in the area of the Alcan facility is towards the southeast. The local ground water flow, determined from water level measurements collected at the Alcan facility, is generally in an easterly direction. The discharge location for surface runoff and ground water in this area is most likely to the Elizabeth River which is located approximately 4,000 feet east of the facility.

The in-situ hydraulic conductivity tests performed during the development of the monitoring wells indicate an average hydraulic conductivity value of 5.32×10^{-3} cm/sec. This value is indicative of glacial till deposits as is the case in this area. It should be noted that hydraulic conductivity values ranged from 7.45×10^{-4} cm/sec in the northwest most well to 1.11×10^{-2} cm/sec in the southeast most well, indicating that the hydraulic conductivity of the soils increases from northeast to southeast.

The approximate horizontal ground water flow velocity has been calculated at a rate of 0.75 ft/day. This value was determined using the average hydraulic conductivity value of 5.32×10^{-3} cm/sec multiplied by a horizontal hydraulic gradient of 0.02 and divided by estimated porosity value of 40%. The 0.75 ft/day flow rate is a average estimated value. The ground water flow velocity may vary significantly across the site.

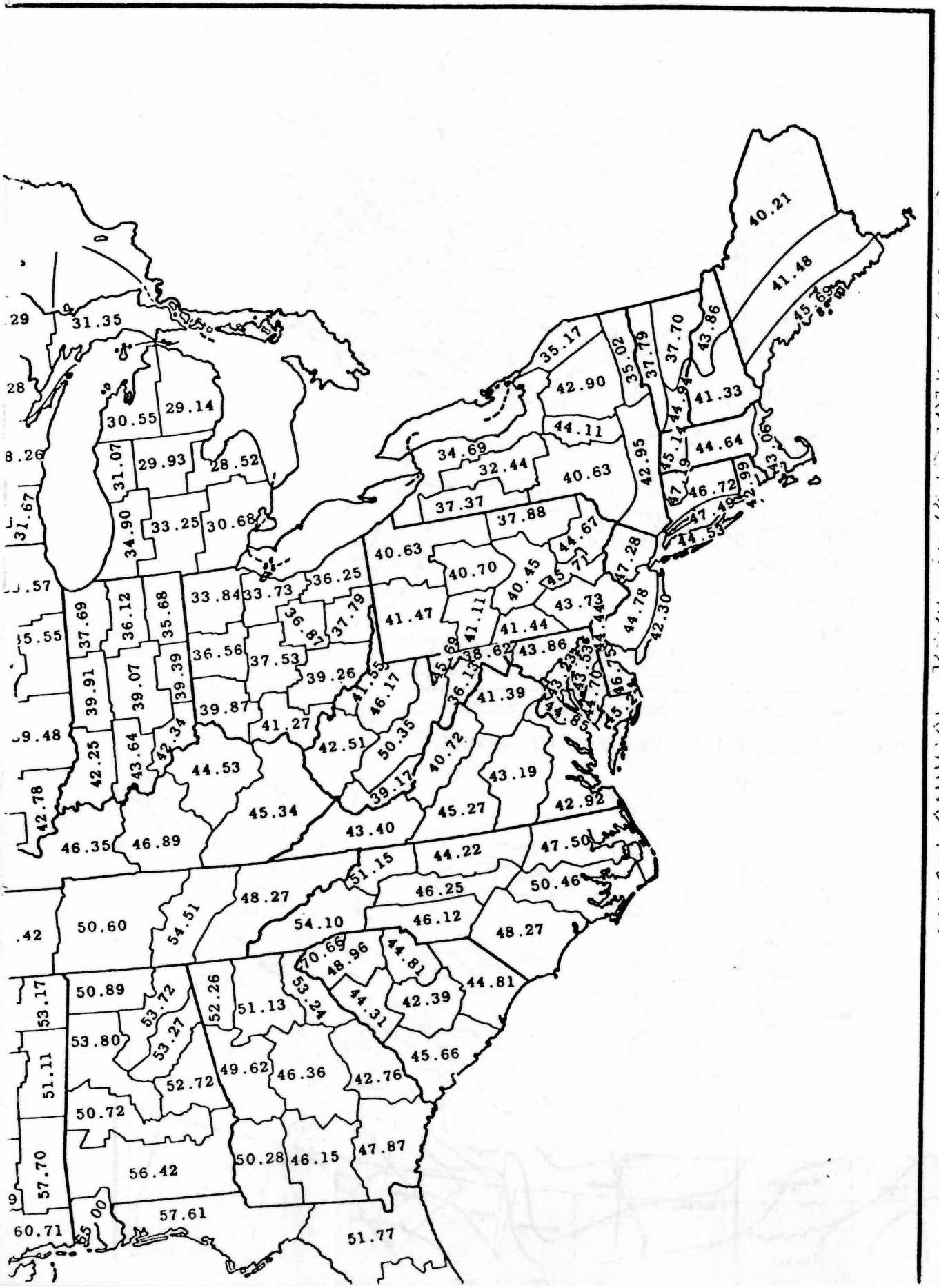
REFERENCE #6





TAKEN FROM: Climatic Atlas of the U.S.
U.S. Dept. of Commerce, 1979.

IMATIC DIVISIONS



MEAN ANNUAL TOTAL PRECIPITATION (INCHES)
BY STATE CLIMATIC DIVISIONS
TAKEN FROM: CLIMATIC ATLAS OF THE U.S.
U.S. DEPT. OF COMMERCE, 1979

REFERENCE #7

C.C. JOHNSON & MALHOTRA, P.C.
601 Wheaton Plaza South
SILVER SPRING, MARYLAND 20902
(301) 942-5600

JOB ALCAN POWDERS & PIGMENTS
SHEET NO. 1 OF 1
CALCULATED BY J. HAAS DATE AUG 24, 1992
CHECKED BY DATE
SCALE

NET PRECIPITATION CALCULATIONS

GIVEN: THE MEAN TOTAL PRECIPITATION (INCHES) OF THE AREA IS 47.28 AND THE MEAN ANNUAL LAKE EVAPORATION OF THE AREA IS 32.0 INCHES

FIND: THE NET PRECIPITATION FOR THE AREA.

REF: CLIMATIC ATLAS OF THE UNITED STATES U.S DEPT. OF COMMERCE, 1979

ASSUMPTIONS: LAKES ARE THE ONLY SOURCE OF EVAPORATION

SOLN:

47.28(IN) - 32.0 in = 15.28 IN

REFERENCE #8

Elizabethtown Water Company

Netherwood Operations Center: 1341 North Avenue, Plainfield, NJ 07062 (908) 654-1234
Mailing Address: P.O. Box 111, Plainfield, NJ 07061-0001

July 27, 1992

Mr. Santosh Sharma
CC Johnson & Malhotra
601 Wheaton Plaza South
Silver Spring, Maryland 20902

Dear Mr. Sharma:

Enclosed is your Union County map indicating Elizabethtown Water Company Wells that are located within a four (4) mile radius from your sites in question.

Should you have any questions or need additional information please give me a call.

Sincerely,

Richard A. Sadowski
Superintendent
Wells & Stations

RAS/rs
Encls.

Key #	Well/WellField
1	Springfield Station X
2	Hummocks Station — 3.5-4.5 MGD (24,242
3	St. Walburga Wellfield (4) X
4	Chandler Avenue Well X
5	First Avenue Well X
6	Quinton Avenue Well X
7	Richfield Avenue Well — 100 gpm (872
8	Wittke Wells (2) X
9	Prospect Street Well — 140 gpm (1,210
10	Clark Well X
11	Aberdeen Road Well — 170 gpm (1482
12	Prospect Avenue Well — 125 gpm (10,90
13	Watchung Avenue Well X
14	Glenside Avenue Well — 100 gpm (872
15	Charles Street Station (3) — 500 gpm (43
16	Jerusalem Road Wells (3) — 225 gpm (1
17	Morse Avenue Well — 145 gpm (1264
18	Elm Street Well X
19	Westfield Office Wells (2) X
20	Netherwood Wellfield (13) — 2.5-3.5 MGD for all (8,121

Maximum - Goal - 15%

Name of Municipality	Population Served
Clark	14,739
Cranford	22,779
Fanwood	7,626
Garwood	4,623
Hillside	18,060
Kenilworth	9,141
Linden	34,239
Mountainside	7,599
Plainfield	31,464
Roselle	16,146
Roselle Park	10,374
Scotch Plains	20,850
Union	49,512
Westfield	29,256

REFERENCE #9

JOHNSON & MALHOTRA, P.C.
ENVIRONMENTAL ENGINEERS

Reference
8

TELEPHONE LOG

Project Number	Site Name And Location
-	American Chrome & Chemicals

Contact And Position	Company Or Agency
Mr Richard Sadowsky	Elizabethtown Water Company

Contact Address	Contact Phone Number
	(908) 654 1234

CCJM Employee	Date	Time
Santosh Sharma	7/31/92	11:30

Discussion Contacted Mr Sadosky to find out drinking water sources in Elizabeth in particular and Union County in general. According to him, Elizabeth gets its water from Elizabeth town water company (EWC) and Newark Water Dept (NWD). 85 to 90% of water demand is completed by surface water supply in the area. EWC has an intake at the confluence of Raritan and Millstone Rivers, while NWD has an intake on Pequannock Water Shed. In Union County, groundwater wells supplement the surface water. Their maximum input into any system is 15%. The well water is mixed with surface water in the distribution system. Two other systems are there in Union County. ~~American~~ New Jersey American Water Co. supplies exclusively to Sumit, New Providence, Springfield and Berkley Heights. Also, he does not think there are any Wellhead protection areas in the EWC system.

SANTOSH

Signature Santosh

REFERENCE #10

LATITUDE 40:40:56 LONGITUDE 74:14:33 1980 POPULATION

KM	0.00- 0.4	0.4- 0.8	0.8- 1.6	1.6- 3.2	3.2- 4.8	4.8- 6.4	SECTOR TOTALS
S 1	0	3481	17477	92770	153403	177436	444567
RING TOTALS	0	3481	17477	92770	153403	177436	444567

ALCAN POWDER & PIGMENT INC.
ELIZABETH, NEW JERSEY

Graphical Exposure Modeling System
by General Science Corporation
April 1990

REFERENCE #11

C.C. JOHNSON & MALHOTRA, P.C.
601 Wheaton Plaza South
SILVER SPRING, MARYLAND 20902
(301) 942-5600

JOB Alcan Powders & Pigments
SHEET NO. 1 OF 1
CALCULATED BY J. HAAS DATE Aug 29, 1992
CHECKED BY DATE
SCALE

POPULATION CALCULATIONS

GIVEN: THE POPULATIONS FOR THE 4-MILE RADIUS RINGS

FIND: THE DRINKING WATER POPULATION

ASSUMPTIONS: SINCE WELL/WELLFIELD EXISTS WITHIN THE 1-2 MILE RADIUS RING ASSUME POPULATIONS IN FIRST 3 RINGS RESIDE IN THIS RING, (2) 5% OF POP RECEIVE WATER FROM WELLS

SOLN: EXTRAPOLATE < 1/4 MILE RING

> 1/4 - 1/2 mi POP = 3,481

$3{,}481 / 0.5 = X / .25$ WHERE X = POP in 1/4 mile RADIUS

$X = 1741$

(ADD 76 PERSONS WHO WORK ON-SITE)

$+ 76$

$1{,}817$

> 1/4	15% (1,817) = 273
1/4 - 1/2 mi	15% (3,481) = 522
> 1/2 - 1 mi	15% (13,477) = 2,022
> 1 - 2 mi	15% (92,770) = 13,916
> 2 - 3 mi	15% (153,403) = 23,010
> 3 - 4 mi	15% (177,436) = 26,615

FOR > 1-2 mi = 273 + 522 + 2,022 + 13,916 = 17,333

REFERENCE #12

The ground water elevation map shown in Figures 3 and 4 show that the direction of ground water flow is in an east to northeast direction. The slope of the water table averages 0.02 ft/ft.

The Alcan facility is within the Elizabeth River Drainage Basin. The topographic relief in the area of the Alcan facility is towards the southeast. The local ground water flow, determined from water level measurements collected at the Alcan facility, is generally in an easterly direction. The discharge location for surface runoff and ground water in this area is most likely to the Elizabeth River which is located approximately 4,000 feet east of the facility.

The in-situ hydraulic conductivity tests performed during the development of the monitoring wells indicate an average hydraulic conductivity value of 5.32×10^{-3} cm/sec. This value is indicative of glacial till deposits as is the case in this area. It should be noted that hydraulic conductivity values ranged from 7.45×10^{-4} cm/sec in the northwest most well to 1.11×10^{-2} cm/sec in the southeast most well, indicating that the hydraulic conductivity of the soils increases from northeast to southeast.

The approximate horizontal ground water flow velocity has been calculated at a rate of 0.75 ft/day. This value was determined using the average hydraulic conductivity value of 5.32×10^{-3} cm/sec multiplied by a horizontal hydraulic gradient of 0.02 and divided by estimated porosity value of 40%. The 0.75 ft/day flow rate is a average estimated value. The ground water flow velocity may vary significantly across the site.

the Brunswick Formation ranges from 12 to 870 gpm and the average yield is 200 gpm. The major water producing zones within the formation are most often encountered between depths of 200 and 600 feet (Nemickas, 1976).

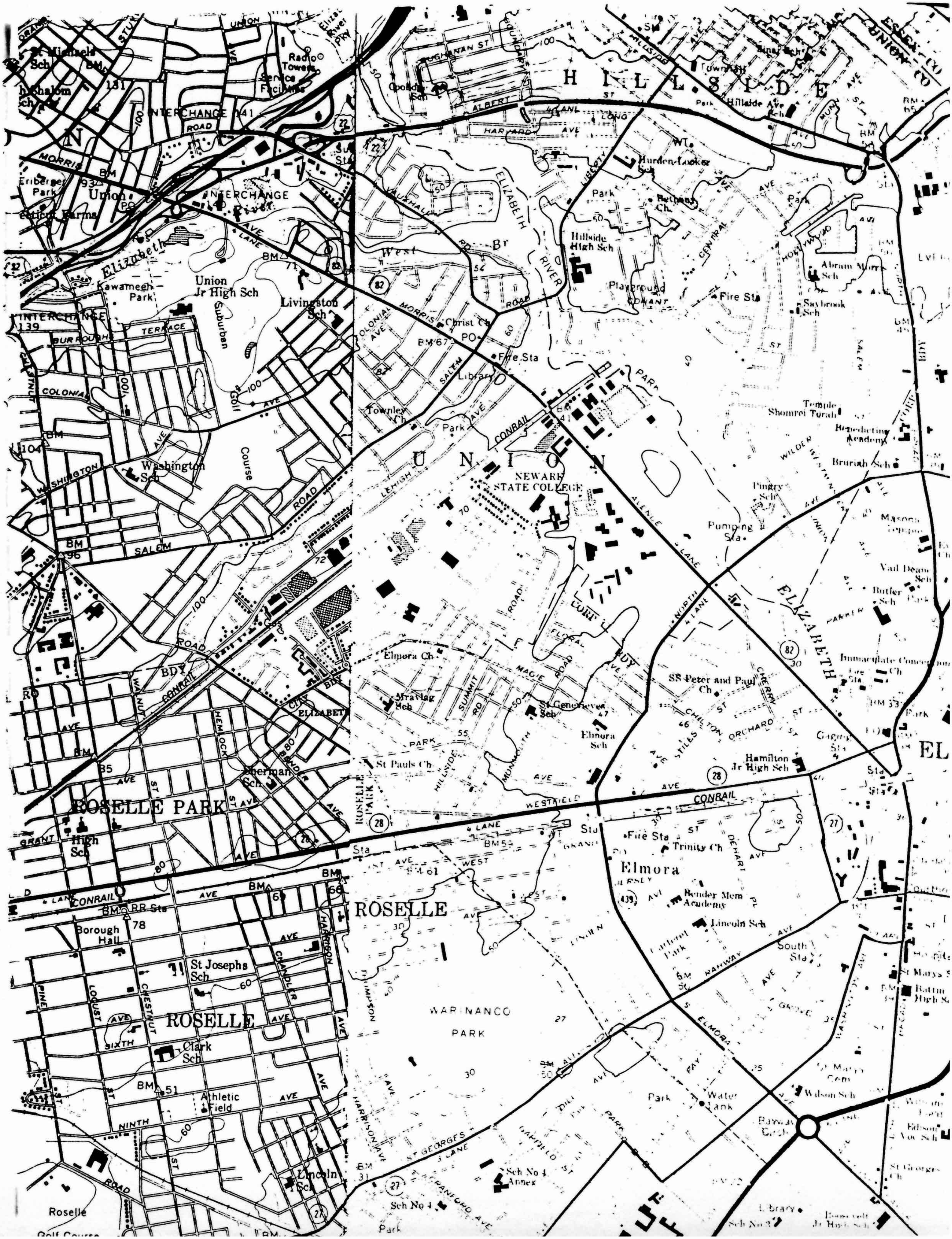
There are no known public water supplying well fields within a two mile radius of the Alcan facility. The closest public well fields are between 2 and 2.5 miles from the site and include: the municipalities of Union, Kenliwok and Roselle (Nemickas, 1976). Each of these well fields had an average pumpage of 3.0, 0.3, and 0.3 million gallons per day, respectively from the Brunswick Formation. The regional data indicated there are several industrial supply wells located within the Town of Union.

3.03 Site Hydrogeology

The soil boring logs show the immediate vicinity of the Alcan facility to be underlain by a glacial till deposit composed of predominantly of an unsorted mixture of fine to medium sand, silt and fragments of shale and sandstone. The test boring logs indicate that the thickness of the till overlying bedrock ranged from 8.5 feet at TB-8 to at least 20 feet at TB-3 and TB-4.

Ground water elevation data, summarized in Table 2, indicates that ground water was encountered at a depth ranging from 6.9 feet to 16.5 feet below grade. Ground water was not encountered at monitoring well MW-7 due to a localized topographic high of the bedrock at this location.

REFERENCE #13



HILLSIDE
UNION
ROSELLE PARK
ROSELLE
Elmora
ELIZABETH
NEWARK STATE COLLEGE
INTERCHANGE 141
INTERCHANGE 139
Union
Elizabeth River
Kawameeh Park
Union Jr High Sch
Livingston Sch
Suburban Golf Course
Washington Sch
Christ Ch
PO
Fire Sta
Library
Townley Ch
Hillside High Sch
Playground
Hurden-Looker Sch
Bethany Ch
Abram Morris Sch
Saybrook Sch
Temple Shomrei Torah
Benedictine Academy
Bruriah Sch
Pingry Sch
Pumping Sta
Masonic Temple
Butler Sch
Immaculate Conception Ch
SS Peter and Paul Ch
Hamilton Jr High Sch
Elmora Ch
St Genevieves Sch
Elmora Sch
St Pauls Ch
Sherman Sch
Roselle Park High Sch
Borough Hall
St Josephs Sch
Clark Sch
Athletic Field
Lincoln Sch
Roselle Golf Course
WARINANCO PARK
Fire Sta
Trinity Ch
Bender Mem Academy
Lincoln Sch
Carteret Park
South Sta
Water Tank
Bayway Circle
Wilson Sch
Sch No 4 Annex
Sch No 4
Library
MORRIS AVE
SALEM RD
WASHINGTON AVE
COLONIAL AVE
BURROUGHS TERRACE
CONRAIL
WESTFIELD AVE
MAGIE AVE
NORTH AVE
CHILTON ST
ORCHARD ST
STILES ST
RAHWAY AVE
ST GEORGES AVE
CRANFORD AVE
HARRISON AVE
CHESTNUT ST
LOCUST ST
PINE ST
CHANDLER AVE
HEMLOCK
SIXTH AVE
NINTH AVE
LEHIGH AVE
HILLSIDE AVE
SUMMIT RD
LIBERTY AVE
CONANT ST
PARKER RD
WILDER ST

REFERENCE #14

TELEPHONE CONVERSATION RECORD

DATE: 8/17/92 TIME: 2:30pm

PERSON CALLING: John Haas, CCJM

PERSON CALLED: Edul Daver

AFFILIATION: Alcan Powders & Pigments, Union

PHONE NUMBER: 908/851-4504

TOPIC: PA DRAFT

Discussed following items:

- "Creek" mentioned in O'Brien & Gere's Report is not a creek but a ditch where water collects during rainstorms. A creek ~~exists~~ (drainage) exists 1/4 mile north of site.
- Citizen complaints include - noise from plant operations (mostly in the 1970's) occassionally complaints about dust fumes, releases to air from diesel generators

no complaints regarding water wells or odors

- Also discussed three (3) deep aquifer water wells used for plant processes. The plan is to abandon these wells and use treated water from remediation of shallow aquifer as a substitute.

TELEPHONE CONVERSATION RECORD

DATE: 8/17/92 TIME: _____

PERSON CALLING: _____

PERSON CALLED: EDUL DAUEN

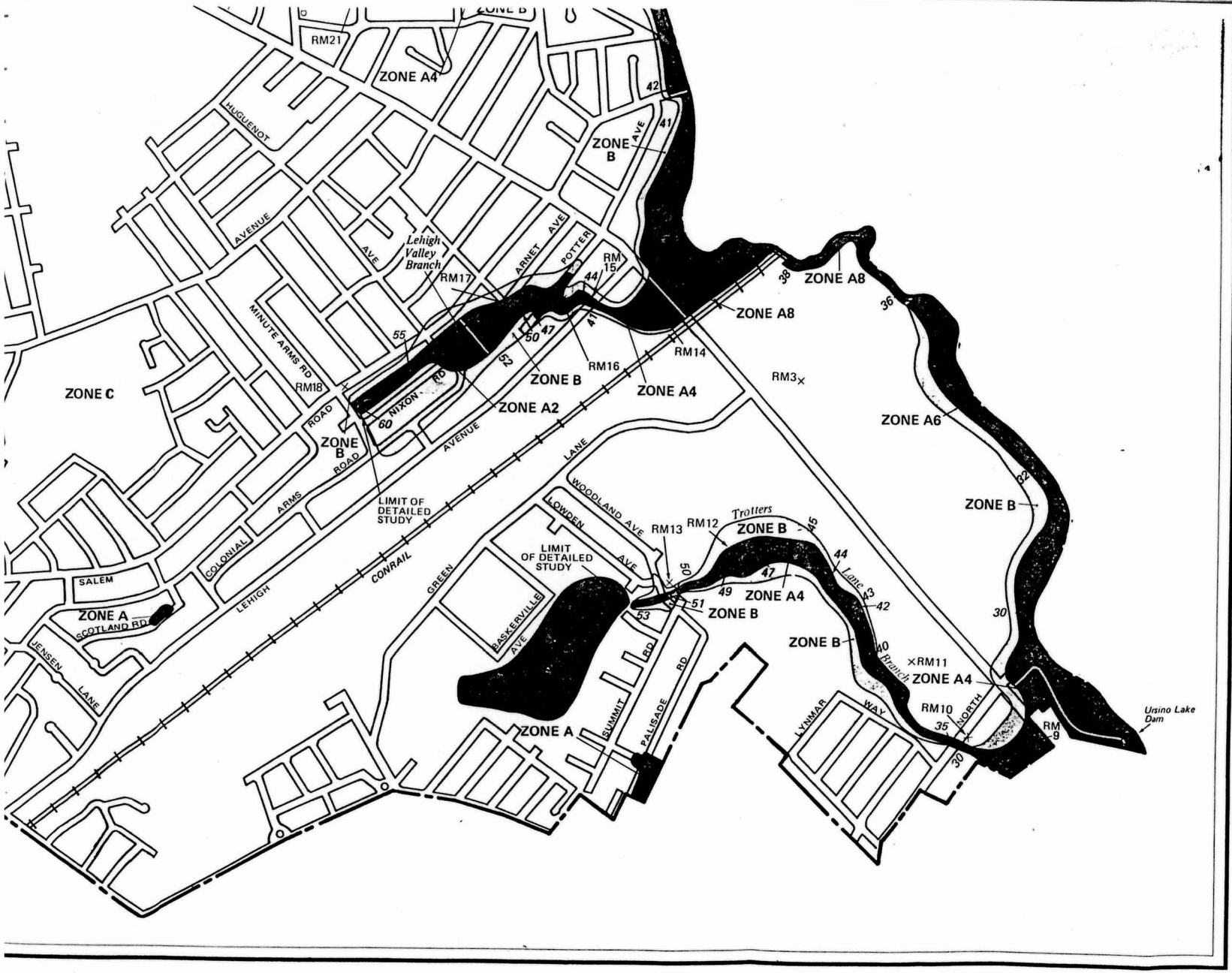
AFFILIATION: _____

PHONE NUMBER: _____

TOPIC: _____

Also discussed sending me copies of permits (originally agreed upon @ site visit). He said he would comply.

REFERENCE #15



APPROXIMATE SCALE

800 0 800 FEET

NATIONAL FLOOD INSURANCE PROG

FLOOD INSURANCE RATE MAP

TOWNSHIP OF
UNION, NEW JERSEY
UNION COUNTY

COMMUNITY-PANEL NUMBER
340477 0001 A

(ONLY PANEL PRINTED)

EFFECTIVE
AUGUST 1, 1978

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATIC

KEY TO MAP

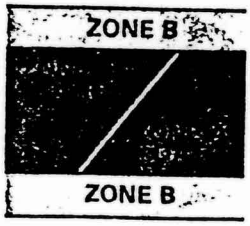
500-Year Flood Boundary

100-Year Flood Boundary

Zone Designations* With Date of Identification e.g., 12/2/74

100-Year Flood Boundary

500-Year Flood Boundary



Base Flood Elevation Line With Elevation In Feet** — 513

Base Flood Elevation in Feet Where Uniform Within Zone** — (EL 987)

Elevation Reference Mark — RM7×

River Mile — • M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

REFERENCE #16

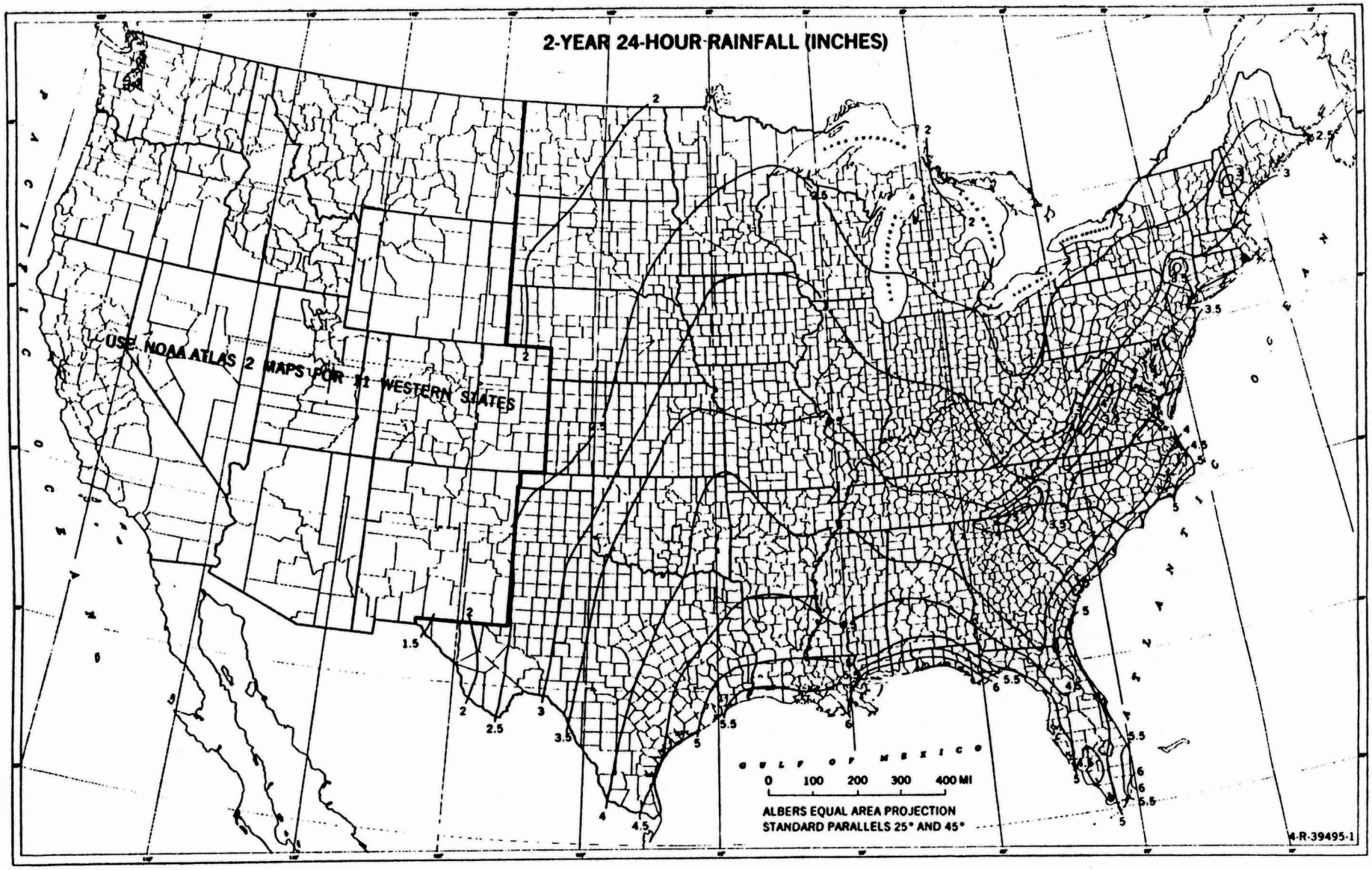


Figure B-3.—Two-year, 24-hour rainfall.

REFERENCE #17

SURFACE WATER INTAKE LOCATIONS
BUREAU OF SAFE DRINKING WATER
With Longitude & Latitudes

Prepared by: Michael Mariano

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
0102001	ATLANTIC CITY WATER DEPARTMENT	609-345-3315	ABSECON	DOUGHTY POND - South tip Mays Landing-Rd. & Mill Rd.	74 31 21.6	39 25 48.75
0238001	MACKENSACK WATER DEPARTMENT	201-767-9300	PARAMUS	SADDLE RIVER - South of intersection of Paramus Rd. & Midland Ave.		
			ORADELL	MACKENSACK RIVER - At Martin Ave.	74 01 36.64	40 56 47.63
			NORTHVALE	SPARK MILL CREEK - Northwest of intersection of Pegasus Ave. & Hill Terr.		
			ORADELL	LONG SWAMP BROOK - At Martin Ave.		
0305001	BURLINGTON CITY WATER DEPARTMENT	609-386-0307	EAST BURLINGTON	DELAWARE RIVER - 1/4 mile north of Assiscunk Creek	74 50 21.82	40 05 19.78
			BURLINGTON ISLAND	BURLINGTON ISLAND LAKE		
0325001	FORT DIX	609-562-5040		RANCOCAS CREEK	74 37 47.10	39 57 36.00
1613001	NJDWSC	201-575-0225	POMPTON LAKES	RAMAPO RIVER - At Pompton Lake (pump to Wanaque Res.)		
			WANAQUE	WANAQUE RESERVOIR - Ringwood Ave & Oricchio Ave	74 17 39.4	41 02 47.67
0717001	CITY OF ORANGE	201-762-6000	SOUTH ORANGE	ORANGE RESERVOIR - On West branch of Rahway River 40 ft upstream from dam	74 17 19.48	40 45 33.65

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
0712001	NJ AMERICAN NORTHERN DISTRICT	201-376-8800	MILLBURN	PASSAIC RIVER - At Kennedy Parkway	74 21 56.16	40 44 42.88
			SHORT HILLS	CANOE BROOK - North of Route 24	74 21 13.31	40 44 40.77
			CALDWELL	POMPTON RIVER - At Bridges Rd.		
0714001	NEWARK WATER DEPT	201-256-4965		PEQUANNOCK WATER SHED	74 25 27.07	41 01 32.44
0906001	JERSEY CITY WATER DEPARTMENT	201-547-4390	BOONTON	BOONTON RESERVOIR - 200 yds northwest of Washington St Bridge	74 23 51.41	40 53 33.80
			ROCKAWAY	SPLIT ROCK RESERVOIR - Empties into Boonton Res. via Rockaway River		
1017001	LAMBERTVILLE WATER DEPARTMENT	609-397-0526	LAMBERTVILLE	SWAN CREEK RESERVOIR EAST	74 55 28.18	40 21 48.52
			LAMBERTVILLE	SWAN CREEK RESERVOIR WEST	74 55 43.90	40 21 46.63
			LAMBERTVILLE	DELAWARE-RARITAN CANAL - At Swan St. (Emergency)	74 56 46.94	40 21 55.90
1111001	CITY OF TRENTON	609-989-3208	TRENTON	DELAWARE RIVER - At Rt 29 north of Calhoun St. Bridge	74 46 45.57	40 13 19.06
1216001	PERTH AMBOY	908-826-0290	OLD BRIDGE	TENNENTS POND - At Waterworks Rd.	74 20 12.23	40 25 33.99
1225001	MIDDLESEX WATER CO	908-634-1500	EDISON	DELAWARE-RARITAN CANAL & MILLSTONE RIVER - At Rt 18	74 27 34.00	40 30 25.66

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
1214001	NEW BRUNSWICK WATER DEPARTMENT	908-745-5060	NEW BRUNSWICK	LAWRENCE BROOK - At Burnet St St.	74 24 49.97	40 28 58.48
			NEW BRUNSWICK	DELAWARE-RARITAN CANAL - At George St & College Ave		
1214001	NORTH BRUNSWICK	908-247-0922	FRANKLIN TWP	DELAWARE-RARITAN CANAL - At Suydam Ave.	74 34 59.03	40 27 38.49
1219001	SAYERVILLE	908-390-7000	OLD BRIDGE	SOUTH RIVER - At Main St North of Rt 18	74 21 41.75	40 24 58.99
1352005	NEW JERSEY WATER SUPPLY AUTH.		WALL TWP	MANASQUAN RIVER - Hospital Rd. North of Garden State Parkway (Pump to Manasquan Reservior)	74 11 27.43	40 10 31.82
1345001	NJ AMERICAN - MONMOUTH		WALL TWP	MANASQUAN RIVER - Hospital Rd. North of GSP (Pump to Glendola Reservoir)	74 04 45.13	40 11 42.47
			NEPTUNE TWP	SHARK RIVER - Off Corlies Ave. 2000' North of GSP	74 04 16.51	40 11 53.69
			NEPTUNE TWP	JUMPING BROOK - At Greensgrove & Corlies Aves	74 03 57.82	40 12 11.83
			LINCROFT	SWIMMING RIVER RESERVOIR - 1000' West of Swimming Riv.	74 07 13.35	40 19 06.70
1326004	MATCHAPONIX		MANALAPAN	MATCHAPONIX BROOK - At Wilson Ave.	74 21 50.42	40 18 33.20
1401001	TOWN OF BOONTON	201-299-7740	MONTVILLE	TAYLORTOWN RESERVOIR - At Taylortown Rd.	74 23 00.06	40 57 13.06

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
1403001	BUTLER WATER DEPT	201-838-7200	BUTLER	KIKEOUT RESERVOIR - At Resevior Rd.	74 21 58.63	40 59 24.13
1424001	SOUTH EAST MORRIS COUNTY	201-538-5600	MENDHAM	CLYDE POTTS RESERVOIR - Cold Hill Rd & Woodland Rd	74 34 51.98	40 48 21.61
1506001	BRICK TWP	908-458-7000		METEDECONK RIVER	74 08 36.45	40 04 28.07
1603001	MALEDON WATER DEPT		MALEDON	MALEDON RESERVOIR - Lower Basin pump station at Belmont Ave.		
1605002	PASSAIC VALLEY WATER COMMISSION	201-256-1566	WAYNE	POMPTON RIVER - At Confluence of Ramapo & Pequannock Rivers		
			TOTOWA	PASSAIC RIVER - At Union Blvd.	74 13 51.49	40 52 58.46
1708300	E.I. DUPONT PENNSVILLE	609-299-5000		SALEM CANAL	75 30 19.63	39 41 08.91
1712001	SALEM WATER DEPT	609-935-0350	CLINTON TWP	LAUREL LAKE - At Waterworks Rd & Lake Ave.	75 24 28.33	39 32 52.62
			ALLOWAY TWP	ELKINTON HILL POND - Waterworks Rd. 3 miles east of Laurel Lake (Seasonal)		
1903001	BRANCHVILLE WATER DEPARTMENT	201-948-6463	FRANKFORD TWP	BRANCHVILLE RESERVOIR - 7300' northeast of Mattison Ave & Mattison School Rd.		
1906002	FRANKLIN WATER DEPT	201-827-7060	FRANKLIN BOROUGH	FRANKLIN POND - Franklin Ave. Across from plant		
1915001	NEWTON WATER DEPT	201-383-3521	SPARTA TWP	MORRIS LAKE	74 34 17.07	41 08 14.40

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
1921001	SUSSEX WATER DEPT	201-967-5622	WANTAGE TWP	COLESVILLE RESERVOIR - At Brink Rd. 400' west of Rt. 23		
2813001	RAHWAY WATER DEPT	201-388-0086	RAHWAY	RAHWAY RIVER - At pump station off Valley Rd & Lambert St.	74 17 26.57	40 37 06.41
2004002	ELIZABETHTOWN WATER COMPANY	201-345-4444	BRIDGEWATER TWP	RARITAN & MILLSTONE RIVERS - At confluence	74 34 01.82	40 32 33.33
2108001	HACKETTSTOWN MUA	201-852-3622	DRAKESTOWN	MINE HILL RESERVOIR - Off Mine Hill Rd.	74 47 41.62	40 51 23.77
			DRAKESTOWN	BURD RESERVOIR - Off Reservoir Rd. Southeast of	74 48 01.64	40 50 27.91

REFERENCE #18

TERRESTRIAL ORGANISMS

Shown in BROWN, species with special status shown in RED.(F) or (S) indicates species protected by Federal or State Legislation (see text)

SYMBOL — SPECIES

PLANTS (301-350)

301 Eastern hemlock
302 Spleenwort (S)
303 Spider lily (S)
304 Pond bush (S)
305 Watermilfoil (S)
306 Hooded pitcher plant (S)
307 Tree
308 Prickly pear cactus (S)
309 Trailing arbutus (S)
310 Eastern bumelia
311 Pitcher plant
312 Baldcypress
313 Redbay
314 Seaside alder
315 Box huckleberry
316 Purple fringeless orchid
317 Pink lady's slipper
318 Ebony spleenwort (S)
319 Orchids (S)
320 Golden club (S)
321 Florida beargrass
322 East-coast coontie
323 Fall-flowering ixia
324 Jackson-vine
325 Spoon-flower
326 Curtiss milkweed
327 Sea lavender
328 Hand fern
329 Needle palm
330 Yellow squirrel-banana
331 Beach creeper
332 Florida coontie
333 Four-petal pawpaw
334 Bird's nest spleenwort
335 Burrowing four-o'clock
336 Beach star
337 Silver palm
338 Dancing lady orchid
339 Tamarindillo
340 Fuch's bromeliad
341 Everglades peperomia
342 Buccaneer palm
343 Slender spleenwort
344 Pineland jacquemontia
345 Mahogany mistletoe
346 Florida thatch
347 Twisted air plant
348 Long's bittercress
349 Venus's flytrap

INVERTEBRATES (351-400)

351 Monarch butterfly
352 Zebra butterfly

BIRDS (401-600)

SHOREBIRDS (401-430)

401 Shorebirds
402 Terns
403 Gulls
404 Forster's tern
405 Arctic tern
406 Least tern (S)
407 Roseate tern (S)
408 Common tern
409 Great black-backed gull
410 Herring gull
411 Laughing gull
412 Black skimmer (S)
413 Turnstones
414 Plovers
415 Piping plover
416 American oystercatcher (S)

WADING BIRDS (431-460)

431 Wading birds
432 Herons
433 Egrets
434 Ibis

40074-A1-EI-250

Newark

N. J.—N. Y.—PA.

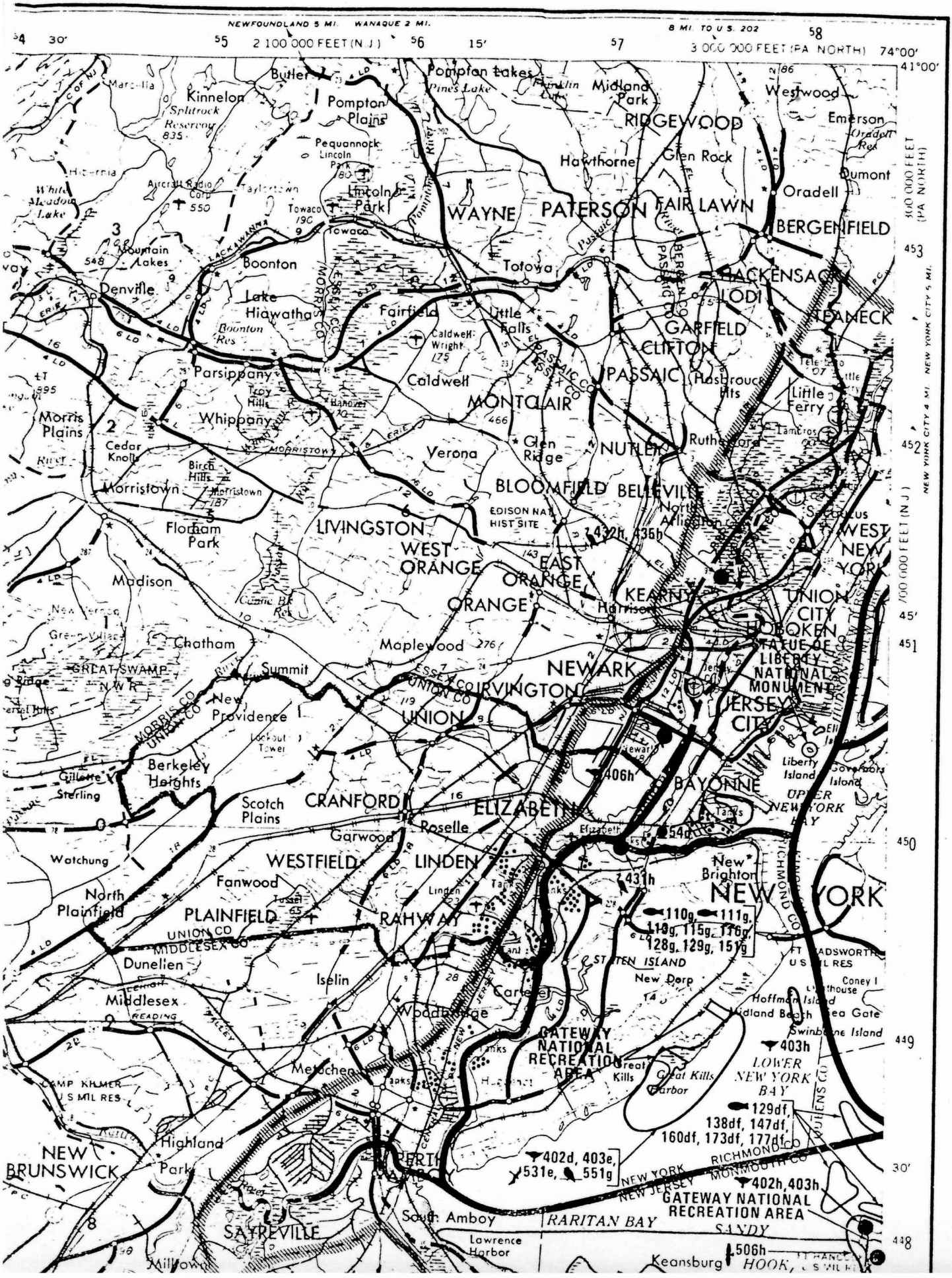
1:250 000-scale map of

Atlantic Coast Ecological Inventory

Produced by

U. S. FISH AND WILDLIFE SERVICE

1980


NEWFOUNDLAND 5 MI.
WANAQUE 2 MI.
8 MI. TO U.S. 202
2 100 000 FEET (N.J.)
3 000 000 FEET (PA NORTH)
74°00'
41°00'
Butler
Pompton Lakes
Midland Park
Westwood
Kinnelon
Pompton Plains
RIDGEWOOD
Emerson
Pequannock
Hawthorne
Glen Rock
Oradell
Lincoln Park
WAYNE
PATERSON
FAIR LAWN
BERGENFIELD
Mountain Lakes
Boonton
Totowa
HACKENSACK
Denville
Lake Hiawatha
Fairfield
Little Falls
GARFIELD
CLIFTON
LODI
TEANECK
Parsippany
Caldwell
PASSAIC
Little Ferry
MONTCLAIR
Whippany
Glen Ridge
NUTLEY
Morris Plains
Cedar Knolls
Verona
Morristown
BLOOMFIELD
BELLEVILLE
Florham Park
LIVINGSTON
WEST ORANGE
EAST ORANGE
ORANGE
KEARNY
UNION CITY
WEST NEW YORK
Madison
HOBOKEN
Chatham
Maplewood
NEWARK
Summit
IRVINGTON
LIBERTY NATIONAL MONUMENT
JERSEY CITY
New Providence
UNION
Berkeley Heights
Gillette
Sterling
Scotch Plains
CRANFORD
ELIZABETH
BAYONNE
Roselle
Garwood
Watchung
WESTFIELD
LINDEN
New Brighton
Fanwood
North Plainfield
PLAINFIELD
RAHWAY
NEW YORK
Dunellen
Iselin
Middlesex
Woodbridge
STATEN ISLAND
New Dorp
GATEWAY NATIONAL RECREATION AREA
Great Kills
Great Kills Harbor
LOWER NEW YORK BAY
Metuchen
CAMP KILMER U.S. MIL RES
NEW BRUNSWICK
Highland Park
PERTH AMBOY
SAYREVILLE
South Amboy
RARITAN BAY
Lawrence Harbor
Keansburg
SANDY HOOK
1432h, 436h
406h
431h
110g, 111g, 113g, 115g, 116g, 128g, 129g, 151g
403h
129df, 138df, 147df, 160df, 173df, 177df
402d, 403e, 531e, 551g
402h, 403h
506h
ESSEX CO
HUDSON CO
UNION CO
MORRIS CO
MIDDLESEX CO
MONMOUTH CO
NEW YORK
NEW JERSEY
453
452
451
450
449
448
30'
45'
700 000 FEET (N.J.)
300 000 FEET (PA NORTH)
NEW YORK CITY 4 MI.
NEW YORK CITY 5 MI.

REFERENCE #19

Appendix

Appendices E, F, G

Site Remediation
Alcan Powders and Pigments
Union, New Jersey Facility

Alcan Aluminum Corporation
Cleveland, Ohio

April 1991

O'BRIEN & GERE

TABLE 2

ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

POLLUTANT METAL	MW-1 mg/l	MW-2 mg/l	MW-3 mg/l	MW-4 mg/l	MW-5 mg/l	MW-6 mg/l	DETECTION LIMIT mg/l	ACTION LEVEL mg/l
DATE SAMPLED	4/11	4/11	4/11	4/6	4/7	4/7	***	***
TOTAL ANTIMONY	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ARSENIC	ND	ND	ND	ND	ND	0.026	0.005	0.05
TOTAL BERYLLIUM	ND	ND	ND	ND	ND	ND	0.03	-
TOTAL CADMIUM	0.04	ND	0.03	0.06	0.04	0.04	0.03	0.01
TOTAL CHROMIUM	0.04	ND	0.11	ND	0.03	0.09	0.03	0.05
TOTAL COPPER	0.3	0.4	0.4	ND	0.5	20.0	0.3	-
TOTAL LEAD	ND	ND	ND	ND	0.3	1.8	0.3	0.05
TOTAL MERCURY	ND	ND	ND	ND	ND	ND	0.001	0.002
TOTAL NICKEL	0.3	ND	ND	ND	ND	1.8	0.3	-
TOTAL SELENIUM	ND	ND	0.005	ND	ND	0.006	0.005	0.01
TOTAL SILVER	ND	ND	ND	ND	ND	ND	0.3	0.05
TOTAL THALLIUM	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ZINC	0.24	0.16	0.35	0.11	0.24	1.41	0.03	-
TOTAL PETROLEUM HYDROCARBONS	<0.5	26	3.55	19100	<0.5	<0.5	0.5	1.0

ND = NONE DETECTED

BMDL = BELOW METHOD DETECTION LIMIT

Note: Action level for metals based on National Interim Primary Drinking Water Standards. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

TABLE 2
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

POLLUTANT METAL	MW-8 mg/l	MW-9 mg/l	MW-10 mg/l	MW-11 mg/l	MW-12 mg/l	MW-13 mg/l	DETECTION LIMIT mg/l	ACTION LEVEL mg/l
DATE SAMPLED	4/11	4/7	4/7	4/7	4/11	4/7	***	***
TOTAL ANTIMONY	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ARSENIC	ND	ND	0.005	ND	.009	0.005	0.005	0.05
TOTAL BERYLLIUM	ND	ND	ND	ND	ND	ND	0.03	-
TOTAL CADMIUM	0.03	0.03	0.03	0.03	ND	0.04	0.03	0.01
TOTAL CHROMIUM	0.06	0.03	0.05	0.06	ND	0.1	0.03	0.05
TOTAL COPPER	0.5	ND	0.5	ND	0.5	0.3	0.3	-
TOTAL LEAD	ND	ND	0.5	ND	ND	ND	0.3	0.05
TOTAL MERCURY	ND	ND	ND	ND	ND	ND	0.001	0.002
TOTAL NICKEL	0.3	ND	ND	0.3	ND	ND	0.3	-
TOTAL SELENIUM	ND	ND	0.008	ND	ND	ND	0.005	0.01
TOTAL SILVER	ND	ND	ND	ND	ND	ND	0.3	0.05
TOTAL THALLIUM	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ZINC	0.18	0.12	0.21	0.20	0.19	0.32	0.03	-
TOTAL PETROLEUM HYDROCARBONS	3.25	<0.5	<0.5	8.40	7.88	<0.5	0.5	1.0

ND = NONE DETECTED

BMDL = BELOW METHOD DETECTION LIMIT

Note: Action level for metals based on National Interim Primary Drinking Water Standard. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

TABLE 2
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS
FIELD BLANKS

POLLUTANT METAL	FIELD BLANK 1 (mg/l)	FIELD BLANK 2 (mg/l)	FIELD BLANK 3 (mg/l)	DETECTION LIMIT mg/l	ACTION LEVEL mg/l
DATE SAMPLED	4/6	4/7	4/11	***	***
TOTAL ANTIMONY	ND	ND	ND	0.3	-
TOTAL ARSENIC	ND	ND	ND	0.005	0.05
TOTAL BERYLLIUM	ND	ND	ND	0.03	-
TOTAL CADMIUM	ND	ND	ND	0.03	0.01
TOTAL CHROMIUM	ND	ND	ND	0.03	0.05
TOTAL COPPER	ND	ND	ND	0.3	-
TOTAL LEAD	ND	ND	ND	0.3	0.05
TOTAL MERCURY	ND	ND	ND	0.001	0.002
TOTAL NICKEL	ND	ND	ND	0.3	-
TOTAL SELENIUM	ND	ND	ND	0.005	0.01
TOTAL SILVER	ND	ND	ND	0.3	0.05
TOTAL THALLIUM	ND	ND	ND	0.3	-
TOTAL ZINC	ND	ND	ND	0.03	-
TOTAL PETROLEUM HYDROCARBONS	<0.5	1.0	<0.5	0.5	1.0

ND = NONE DETECTED

Note: Action level for metals based on National Interim Primary Drinking Water Standards. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

REFERENCE #20

Appendix

Appendices E, F, G

Site Remediation
Alcan Powders and Pigments
Union, New Jersey Facility

Alcan Aluminum Corporation
Cleveland, Ohio

April 1991

O'BRIEN & GERE

TABLE 3

ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS

POLLUTANT ORGANIC	MW-1 ug/l	MW-2 ug/l	MW-3 ug/l	MW-4 ug/l	MW-5 ug/l	MW-6 ug/l	DETECTION LIMIT ug/l
DATE SAMPLED	4/11	4/11	4/11	4/6	4/7	4/7	***
BENZENE	ND	9.7	7.4	BMDL	BMDL	13	2.2
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	ND	ND	ND	5.0
CHLOROFORM	ND	ND	ND	ND	ND	ND	1.0
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	5.0
ETHYLBENZENE	ND	393	ND	164	57	BMDL	3.6
METHYL BROMIDE	ND	ND	ND	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0
METHYLENE CHLORIDE	7.0	7.0	6.8	62	5.2	5.0	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	3.4
TETRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND	2.0
TOLUENE	ND	ND	ND	198	ND	ND	3.0
1,2-TRANS-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.5
TRICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	ND	ND	ND	80	7.6	ND	5.0
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0

ND = NONE DETECTED

BMDL = BELOW METHOD DETECTION LIMIT

Note: Action level for individual volatile organic constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.

TABLE 3
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS

POLLUTANT ORGANIC	MW-8 ug/l	MW-9 ug/l	MW-10 ug/l	MW-11 ug/l	MW-12 ug/l	MW-13 ug/l	DETECTION LIMIT ug/l
DATE SAMPLED	4/11	4/7	4/7	4/7	4/11	4/7	***
BENZENE	ND	ND	ND	9.9	15	9.5	2.2
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	ND	ND	ND	5.0
CHLOROFORM	ND	ND	ND	ND	ND	ND	1.0
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	5.0
ETHYLBENZENE	ND	ND	ND	ND	236	3.9	3.6
METHYL BROMIDE	ND	ND	ND	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0
METHYLENE CHLORIDE	7.0	5.0	5.3	4.1	7.4	5.0	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	3.4
TETRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND	2.0
TOLUENE	ND	ND	BMDL	ND	ND	ND	3.0
1,2-TRANS-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.5
TRICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	ND	ND	ND	80	ND	ND	5.0
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0

ND = NONE DETECTED

BMDL = BELOW METHOD DETECTION LIMIT

Note: Action level for individual volatile organic constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.

TABLE 3
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS
FIELD BLANKS

POLLUTANT ORGANIC	FIELD BLANK 1 (ug/l)	FIELD BLANK 2 (ug/l)	FIELD BLANK 3 (ug/l)	DETECTION LIMIT ug/l
DATE SAMPLED	4/6	4/7	4/11	***
BENZENE	ND	ND	ND	2.2
BROMODICHLOROMETHANE	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	5.0
CHLOROFORM	ND	2.0	ND	1.0
1,1-DICHLOROETHANE	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	5.0
ETHYLBENZENE	ND	ND	ND	3.6
METHYL BROMIDE	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	5.0
METHYLENE CHLORIDE	6.6	5.0	8.3	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	3.4
TETRACHLOROETHYLENE	ND	ND	ND	2.0
TOLUENE	ND	ND	BMDL	3.0
1,2-TRANS-DICHLOROETHYLENE	ND	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	2.5
TRICHLOROETHYLENE	ND	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	ND	ND	ND	5.0
VINYL CHLORIDE	ND	ND	ND	5.0

ND = NONE DETECTED

BMDL = BELOW METHOD DETECTION LIMIT

Note: Action level for individual volatile organic constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-2

ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

POLLUTANT METAL	MW-1 mg/l	MW-2 mg/l	MW-3 mg/l	MW-4 mg/l	MW-5 mg/l	MW-6 mg/l	DETECTION LIMIT mg/l	ACTION LEVEL mg/l
DATE SAMPLED	7/7	7/6	7/6	7/6	7/6	7/7	***	***
TOTAL ANTIMONY	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ARSENIC	ND	ND	0.009	0.020	ND	ND	0.005	0.05
TOTAL BERYLLIUM	ND	ND	ND	ND	ND	ND	0.03	-
TOTAL CADMIUM	0.02	0.01	0.02	0.03	0.01	ND	0.01	0.01
TOTAL CHROMIUM	0.26	ND	0.033	0.05	ND	0.122	0.03	0.05
TOTAL COPPER	0.26	0.16	0.12	0.5	0.25	0.68	0.03	-
TOTAL LEAD	0.213	0.053	0.079	0.306	0.167	0.037	0.03	0.05
TOTAL MERCURY	ND	ND	ND	ND	ND	0.068	0.001	0.002
TOTAL NICKEL	ND	ND	ND	0.54	ND	0.89	0.3	-
TOTAL SELENIUM	ND	ND	ND	ND	ND	ND	0.005	0.01
TOTAL SILVER	ND	ND	ND	ND	ND	ND	0.03	0.05
TOTAL THALLIUM	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ZINC	0.57	0.08	0.1	1.89	0.09	0.15	0.03	-
TOTAL PETROLEUM HYDROCARBONS	<0.5	30	7	6440	1.3	3.0	0.5	1.0

ND = NONE DETECTED

Note: Action level for metals based on National Interim Primary Drinking Water Standards. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-2
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

POLLUTANT METAL	MW-8 mg/l	MW-9 mg/l	MW-10 mg/l	MW-11 mg/l	MW-12 mg/l	MW-13 mg/l	DETECTION LIMIT mg/l	ACTION LEVEL mg/l
DATE SAMPLED	7/7	7/7	7/6	7/6	7/6	7/6	***	***
TOTAL ANTIMONY	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ARSENIC	ND	ND	ND	ND	0.006	0.006	0.005	0.05
TOTAL BERYLLIUM	ND	ND	ND	ND	ND	0.036	0.03	-
TOTAL CADMIUM	ND	ND	0.02	0.02	0.02	0.04	0.01	0.01
TOTAL CHROMIUM	ND	0.152	0.17	ND	0.083	0.39	0.03	0.05
TOTAL COPPER	0.07	0.27	4.59	0.42	5.08	0.73	0.03	-
TOTAL LEAD	0.202	0.132	4.46	0.079	0.140	0.537	0.03	0.05
TOTAL MERCURY	ND	ND	ND	ND	ND	ND	0.001	0.002
TOTAL NICKEL	ND	ND	ND	ND	ND	0.77	0.3	-
TOTAL SELENIUM	ND	ND	ND	ND	ND	ND	0.005	0.01
TOTAL SILVER	ND	ND	ND	ND	ND	ND	0.03	0.05
TOTAL THALLIUM	ND	ND	ND	ND	ND	ND	0.3	-
TOTAL ZINC	0.04	0.26	0.76	0.14	1.45	0.036	0.03	-
TOTAL PETROLEUM HYDROCARBONS	2.75	0.6	<0.5	10	6	26	0.5	1.0

ND = NONE DETECTED

Note: Action level for metals based on National Interim Primary Drinking Water Standard. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-2
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUNDWATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS
FIELD BLANKS

POLLUTANT METAL	FIELD BLANK 1 (mg/l)	FIELD BLANK 2 (mg/l)	DETECTION LIMIT mg/l	ACTION LEVEL mg/l
DATE SAMPLED	7/6	7/7	***	***
TOTAL ANTIMONY	ND	ND	0.3	-
TOTAL ARSENIC	ND	ND	0.005	0.05
TOTAL BERYLLIUM	ND	ND	0.03	-
TOTAL CADMIUM	0.01	ND	0.03	0.01
TOTAL CHROMIUM	ND	ND	0.03	0.05
TOTAL COPPER	ND	ND	0.3	-
TOTAL LEAD	ND	ND	0.3	0.05
TOTAL MERCURY	ND	ND	0.001	0.002
TOTAL NICKEL	ND	ND	0.3	-
TOTAL SELENIUM	ND	ND	0.005	0.01
TOTAL SILVER	ND	ND	0.3	0.05
TOTAL THALLIUM	ND	ND	0.3	-
TOTAL ZINC	ND	ND	0.03	-
TOTAL PETROLEUM HYDROCARBONS	<0.5	<0.5	0.5	1.0

ND = NONE DETECTED

Note: Action level for metals based on National Interim Primary Drinking Water Standards. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-3

ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS

POLLUTANT ORGANIC	MW-1 ug/l	MW-2 ug/l	MW-3 ug/l	MW-4 ug/l	MW-5 ug/l	MW-6 ug/l	DETECTION LIMIT ug/l
DATE SAMPLED	7/7	7/6	7/6	7/6	7/6	7/7	***
BENZENE	ND	21	17	ND	ND	3.8	2.2
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	ND	ND	ND	5.0
CHLOROFORM	ND	ND	ND	ND	ND	ND	1.0
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	5.0
ETHYLBENZENE	ND	748	ND	ND	19	ND	3.6
METHYL BROMIDE	ND	ND	ND	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0
METHYLENE CHLORIDE	10	11	8.0	11	11	9.6	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	3.4
TETRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND	2.0
TOLUENE	ND	54	ND	ND	ND	ND	3.0
1,2-TRANS-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.5
TRICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	ND	ND	ND	80	7.6	ND	5.0
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0

ND = NONE DETECTED

Note: Action level for individual volatile organic constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-3
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS

POLLUTANT ORGANIC	MW-8 ug/l	MW-9 ug/l	MW-10 ug/l	MW-11 ug/l	MW-12 ug/l	MW-13 ug/l	DETECTION LIMIT ug/l
DATE SAMPLED	7/7	7/7	7/6	7/6	7/6	7/6	***
BENZENE	ND	ND	ND	11	11	9.4	2.2
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	ND	ND	ND	5.0
CHLOROFORM	ND	ND	ND	ND	ND	ND	1.0
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND	5.0
ETHYLBENZENE	ND	ND	ND	ND	140	254	3.6
METHYL BROMIDE	ND	ND	ND	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0
METHYLENE CHLORIDE	11	11	11	11	11	11	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	3.4
TETRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND	2.0
TOLUENE	ND	ND	ND	ND	ND	ND	3.0
1,2-TRANS-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	2.5
TRICHLOROETHYLENE	ND	ND	ND	ND	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	ND	ND	ND	ND	ND	ND	5.0
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	5.0

ND = NONE DETECTED

Note: Action level for individual volatile organic constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-3
(CONTINUED)
ALCAN POWDERS AND PIGMENTS

SHALLOW AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS
FIELD BLANKS

POLLUTANT ORGANIC	FIELD BLANK 1 (ug/l)	FIELD BLANK 2 (ug/l)	TRIP BLANK 1 (ug/l)	DETECTION LIMIT (ug/l)
DATE SAMPLED	7/6	7/7	7/6	***
BENZENE	ND	ND	ND	2.2
BROMODICHLOROMETHANE	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	5.0
CHLOROFORM	ND	12	ND	1.0
1,1-DICHLOROETHANE	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	5.0
ETHYLBENZENE	ND	16	ND	3.6
METHYL BROMIDE	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	5.0
METHYLENE CHLORIDE	11	10	12	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	3.4
TETRACHLOROETHYLENE	ND	ND	ND	2.0
TOLUENE	ND	ND	ND	3.0
1,2-TRANS-DICHLOROETHYLENE	ND	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	2.5
TRICHLOROETHYLENE	ND	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	ND	ND	ND	5.0
VINYL CHLORIDE	ND	ND	ND	5.0

ND = NONE DETECTED

Note: Action level for individual volatile organic constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.

REFERENCE #21

Appendix

Appendices E, F, G

Site Remediation
Alcan Powders and Pigments
Union, New Jersey Facility

Alcan Aluminum Corporation
Cleveland, Ohio

April 1992

O'BRIEN & GERE

TABLE 4

ALCAN POWDERS AND PIGMENTS

DEEP AQUIFER GROUND WATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

POLLUTANT METAL	SUPPLY WELL NUMBER 1 (mg/l)	SUPPLY WELL NUMBER 2 (mg/l)	SUPPLY WELL NUMBER 3 (mg/l)	FIELD BLANK (mg/l)	FIELD BLANK (mg/l)	DETECTION LIMIT (mg/l)	ACTION LEVELS (mg/l)
DATE SAMPLED	4/8	4/7	4/7	4/7	4/8	***	***
TOTAL ANTIMONY	ND	ND	ND	ND	ND	0.3	-
TOTAL ARSENIC	0.005	ND	ND	ND	ND	0.005	0.05
TOTAL BERYLLIUM	ND	ND	ND	ND	ND	0.03	-
TOTAL CADMIUM	0.03	ND	0.03	ND	ND	0.03	0.01
TOTAL CHROMIUM	ND	ND	ND	ND	ND	0.03	0.05
TOTAL COPPER	ND	ND	ND	ND	ND	0.3	-
TOTAL LEAD	ND	ND	ND	ND	ND	0.3	0.05
TOTAL MERCURY	ND	ND	ND	ND	ND	0.001	0.002
TOTAL NICKEL	ND	ND	ND	ND	ND	0.3	-
TOTAL SELENIUM	ND	ND	ND	ND	ND	0.005	0.01
TOTAL SILVER	ND	ND	ND	ND	ND	0.3	0.05
TOTAL THALLIUM	ND	ND	ND	ND	ND	0.3	-
TOTAL ZINC	0.12	ND	0.07	ND	ND	0.03	-
TOTAL PETROLEUM HYDROCARBONS	<0.5	<0.5	2.20	1.0	<0.5	0.5	1.0

ND = NONE DETECTED

Note: Action level for metals based on National Interim Primary Drinking Water Standards. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-4

ALCAN POWDERS AND PIGMENTS

DEEP AQUIFER GROUND WATER ANALYSES
METALS AND PETROLEUM HYDROCARBONS

POLLUTANT METAL	SUPPLY WELL NUMBER 1 (mg/l)	SUPPLY WELL NUMBER 2 (mg/l)	SUPPLY WELL NUMBER 3 (mg/l)	FIELD BLANK (mg/l)	FIELD BLANK (mg/l)	DETECTION LIMIT (mg/l)	ACTION LEVELS (mg/l)
DATE SAMPLED	7/7	7/6	7/6	7/6	7/7	***	***
TOTAL ANTIMONY	ND	ND	ND	ND	ND	0.3	-
TOTAL ARSENIC	ND	ND	ND	ND	ND	0.005	0.05
TOTAL BERYLLIUM	ND	ND	ND	ND	ND	0.03	-
TOTAL CADMIUM	ND	0.01	0.01	0.01	ND	0.01	0.01
TOTAL CHROMIUM	ND	ND	ND	ND	ND	0.03	0.05
TOTAL COPPER	ND	ND	ND	ND	ND	0.03	-
TOTAL LEAD	0.037	ND	0.035	ND	ND	0.03	0.05
TOTAL MERCURY	ND	ND	ND	ND	ND	0.001	0.002
TOTAL NICKEL	ND	ND	ND	ND	ND	0.3	-
TOTAL SELENIUM	ND	ND	ND	ND	ND	0.005	0.01
TOTAL SILVER	ND	ND	ND	ND	ND	0.03	0.05
TOTAL THALLIUM	ND	ND	ND	ND	ND	0.3	-
TOTAL ZINC	ND	ND	ND	ND	ND	0.03	-
TOTAL PETROLEUM HYDROCARBONS	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	1.0

ND = NONE DETECTED

Note: Action level for metals based on National Interim Primary Drinking Water Standards. Action level for petroleum hydrocarbons based on NJDEP guidelines.

All samples collected in 1988.

REFERENCE #22

Appendix

Appendices E, F, G

Site Remediation
Alcan Powders and Pigments
Union, New Jersey Facility

Alcan Aluminum Corporation
Cleveland, Ohio

April 1999

O'BRIEN & GERE

TABLE 5

ALCAN POWDERS AND PIGMENTS

DEEP AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS

POLLUTANT ORGANIC	SUPPLY WELL NUMBER 1 (ug/l)	SUPPLY WELL NUMBER 2 (ug/l)	SUPPLY WELL NUMBER 3 (ug/l)	FIELD BLANK (ug/l)	FIELD BLANK (ug/l)	DETECTION LIMIT (ug/l)
DATE SAMPLED	4/8	4/7	4/7	4/7	4/8	***
BENZENE	ND	ND	ND	ND	ND	2.2
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	ND	ND	5.0
CHLOROFORM	ND	ND	ND	2.0	ND	1.0
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	5.0
ETHYLBENZENE	ND	ND	ND	ND	ND	3.6
METHYL BROMIDE	ND	ND	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	ND	ND	5.0
METHYLENE CHLORIDE	4.6	5.6	5.3	5.0	6.6	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	3.4
TETRACHLOROETHYLENE	72	17	87	ND	ND	2.0
TOLUENE	ND	ND	BMDL	ND	ND	3.0
1,2-TRANS-DICHLOROETHYLENE	23	66	23	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	2.5
TRICHLOROETHYLENE	43	63	45	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	8.1	ND	ND	ND	ND	5.0
VINYL CHLORIDE	ND	ND	ND	ND	ND	5.0

ND = NONE DETECTED

BMDL = BELOW METHOD DETECTION LIMIT

Note: Action level for individual volatile organics constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.

TABLE A-5

ALCAN POWDERS AND PIGMENTS

DEEP AQUIFER GROUND WATER ANALYSES
VOLATILE HALOGENATED ORGANICS

POLLUTANT ORGANIC	SUPPLY WELL NUMBER 1 (ug/l)	SUPPLY WELL NUMBER 2 (ug/l)	SUPPLY WELL NUMBER 3 (ug/l)	FIELD BLANK (ug/l)	FIELD BLANK (ug/l)	DETECTION LIMIT (ug/l)
DATE SAMPLED	7/7	7/6	7/6	7/6	7/7	***
BENZENE	ND	ND	ND	ND	ND	2.2
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	1.1
BROMOFORM	ND	ND	ND	ND	ND	2.2
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	1.4
CHLOROBENZENE	ND	ND	ND	ND	ND	3.0
CHLORODIBROMOMETHANE	ND	ND	ND	ND	ND	1.5
CHLOROETHANE	ND	ND	ND	ND	ND	5.0
2-CHLOROETHYVINYL ETHER	ND	ND	ND	ND	ND	5.0
CHLOROFORM	ND	ND	ND	ND	12	1.0
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	2.3
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	1.4
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	1.4
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	3.0
trans-1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	2.5
cis,1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	5.0
ETHYLBENZENE	ND	ND	ND	ND	16	3.6
METHYL BROMIDE	ND	ND	ND	ND	ND	5.0
METHYL CHLORIDE	ND	ND	ND	ND	ND	5.0
METHYLENE CHLORIDE	11	9.8	9.7	11	10	1.4
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	3.4
TETRACHLOROETHYLENE	85	16	83	ND	ND	2.0
TOLUENE	ND	ND	ND	ND	ND	3.0
1,2-TRANS-DICHLOROETHYLENE	20	62	20	ND	ND	1.0
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	1.9
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	2.5
TRICHLOROETHYLENE	44	66	48	ND	ND	1.0
TRICHLOROTRIFLUOROETHANE	ND	ND	ND	ND	ND	5.0
VINYL CHLORIDE	ND	ND	ND	ND	ND	5.0

ND = NONE DETECTED

Note: Action level for individual volatile organics constituents is 5.0 ug/l which is based on NJDEP guidelines.

All samples collected in 1988.